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Page 48

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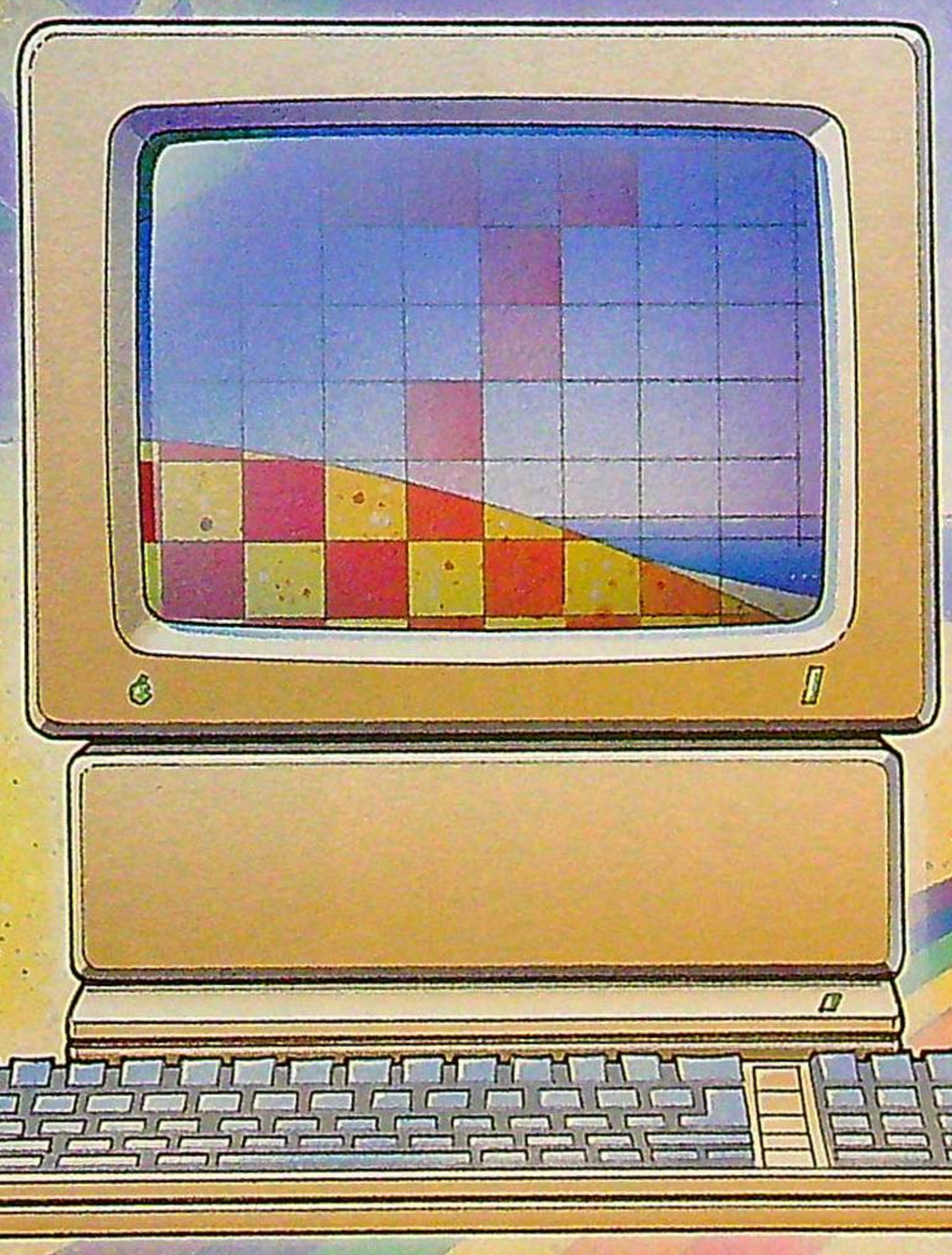

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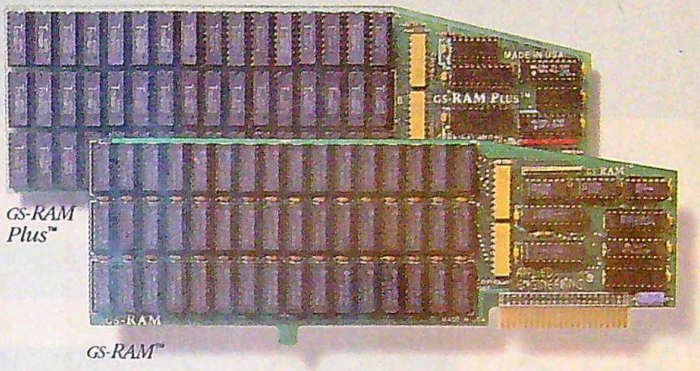

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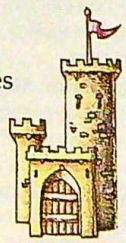
Contents

6
Editor's Notes
Gregg Keizer

The Apple IIGS

12
New Vistas:
Hot Games For The Apple IIGS
Gregg Keizer

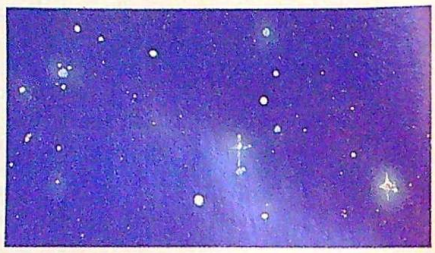
26
Buyer's Guide To Apple IIGS Games
Mickey McLean



At Work

30
Power Of The Press
Dan Gutman

48
HyperCard: Programming Without Pain
David D. Thornburg



At School

56
How Real Can You Get:
Simulations Are Better Than Ever
Tom Netsel

61
Buyer's Guide To Math Games
Mickey McLean

85
Locker
Russell Gibson

90
Help Letters Survive!
Horacio M. Arevalo

95
Stars: An Astronomical Simulation
Robert A. Mulford

Columns

8
Apple News & Notes
The Editors

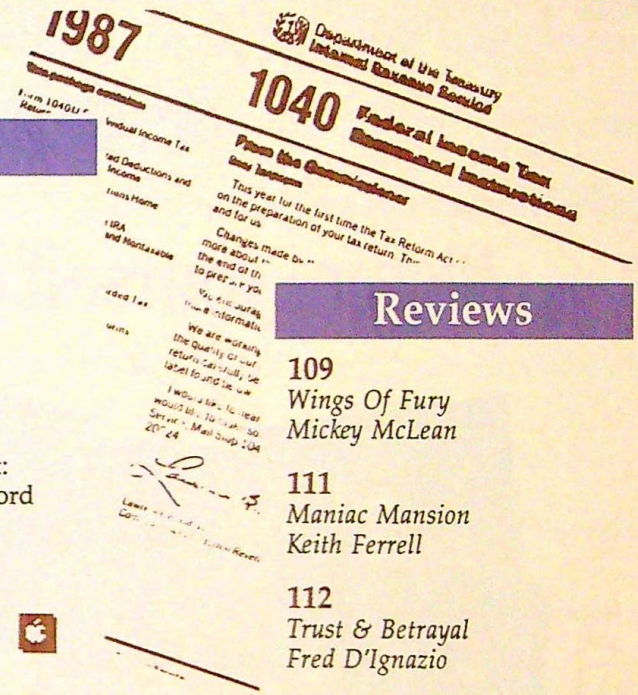
77
Readers' Feedback
The Editors

79
Just For Fun
Dan Gutman

83
Tips, Tricks, & Tidbits
The Editors

Indicates
Type-In Program

April 1988—Vol. 6, No. 2, Issue 8



At Home

64
The Taxman Cometh
Dan McNeill

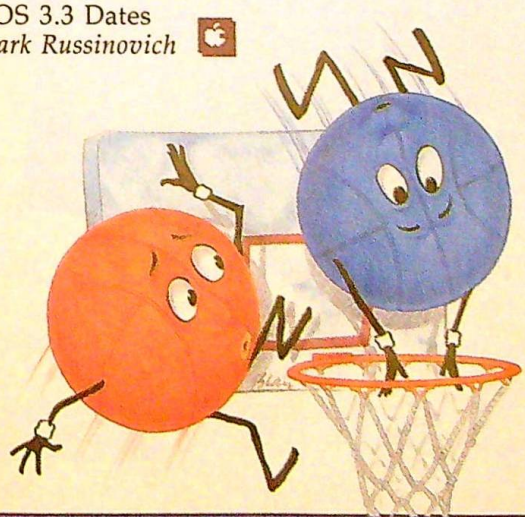
71
AppleWorks For Everyone
Christopher Van Buren

74
You've Got To Love The Games First:
A Conversation With Chris Crawford
Keith Ferrell

37
Basketball Sam & Ed
Rhett Anderson and David Hensley, Jr.

101
Mosquito Madness
Jenny Schmidt

DOS 3.3 Dates
Mark Russinovich



Reviews

109
Wings Of Fury
Mickey McLean

111
Maniac Mansion
Keith Ferrell

112
Trust & Betrayal
Fred D'Ignazio

114
Math And Me
Carol S. Holzberg

116
Timeout
Gregg Keizer

Program Entry Utilities

122
Apple MLX Version 1.1
Tim Victor

126
Apple Automatic Proofreader
Tim Victor

128
Advertisers Index

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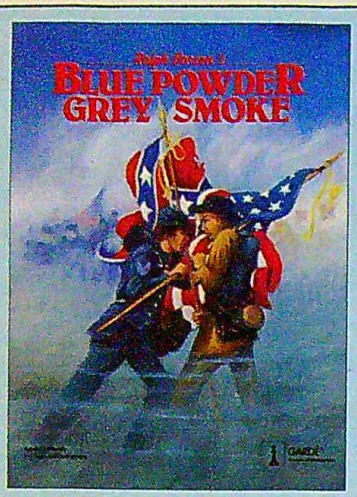

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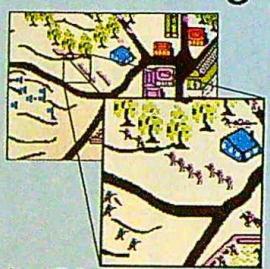

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Editor's Notes

Here's a computer user's nightmare. Personal computers refuse to make a sound, not even a beep. Each machine displays only letters and numbers. Every monitor screen shows only two colors—black and white.

Scary, isn't it? Thankfully, that alternate computer universe is only in the minds of corporate computer systems analysts. If it weren't, we'd just be crunching numbers and moving words with our machines. There would be no fun at home, in school, even at the office, in front of the computer.

Games are important to the personal computer industry, an often overlooked fact. Many of the first home computers—from the Atari 400 to the Apple II+—made their mark with entertainment software. Sure, there were people who used Apple II+'s in their businesses to run programs like *VisaCalc*, but to most of us, computers were great game machines. Think back to when you bought your first computer. Of your first six software purchases, how many were games? Three? Four? All?

That hasn't changed much. Businesses may have more invested in personal computers now, but there are also many more computers in homes and classrooms, traditional game domains. Entertainment is still one of the strongest software categories. In fact, it's going to get even stronger. Home video game purchases are way up, and where video game systems tread, home computers and their more powerful games are sure to follow.

That said, what can we expect in games, and gaming, for the Apple II in 1988?

Columnist Dan Gutman points out the most exciting trend to watch for this year. In this issue's "Just for Fun," he talks to Mark Blank, of *Zork* and Infocom fame, about compact discs, games, and computers. Storytelling, a computer game art-form that stretches across such categories as text adventures, interactive fiction, and fantasy role-playing, will become more sophisticated with the introduction of photo-quality graphics and film-style animation.

Two-player telecommunication games are something else to look for this year. Micro-Illusions, an affiliated label with Electronic Arts, has its One-on-One series of modem games slated for conversion to the Apple IIGS this spring and summer. Dan Bunten, part of the team that designed and developed such classics as *M.U.L.E.* and *Seven Cities of Gold*, has designed a telecommincations game called *The Sport of War* for the Commodore 64. Wait a minute and it

All the Apple II programs in this issue are available on our companion Apple Applications Disk. This 5¼-inch disk, formatted for both DOS 3.3 and ProDOS, runs on any Apple II+, IIe, IIc, or IIGS. You can order this disk ($12.95 plus $2.00 shipping and handling) only through COMPUTE! Publications, either by using the card bound in this issue or by calling toll-free **1-800-346-6767** (in New York, **1-212-887-8525**).

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Coming Attractions

Coming in the June issue of COMPUTE!'s Apple Applications:

Ten You Can't Do Without. Take a look at ten new software and hardware products that you won't want to miss. From desktop publishing to the speedy Zip chip, these are must-have items for 1988.

HomeBase. A full-featured database program that allows you set set up custom input fields anywhere on the screen.

Taking On Big Blue. Can the Macintosh loosen IBM's hold on the business world? This feature analyzes some of the new products that promise Apple a bigger slice of the American business computer dollar.

Complete Cataloger. This short BASIC program catalogs entire ProDOS disks—subdirectories and all—sending its output to either the screen or a printer.

***AppleWorks* Buyer's Guide.** A list of over 30 popular products for *AppleWorks*, including add-on programs, spreadsheet templates, and accessories.

Word Wheel. Spin the wheel and guess the mystery phrase with this fun yet educational word game.

will appear on the Apple II line.

A number of software publishers are trying to move beyond the scope of today's games by merging techniques of several media. Infocom, for example, is working with Tom Snyder ("Snooper Troops") Productions on a software line named "Infocomics." The best description would be video comic books with multiple perspectives. You step through the story, seeing frame after frame of the "book," switching to another character if you want, but only at selected points. It's a more passive experience than gaming, but perhaps one way the genre is moving.

Other game creators are trying to draw new crowds to their products by including such things as adventure game auto-mapping, brand name recognition (by licensing arcade titles or popular board games like *Dungeons and Dragons*), and top-notch graphics. Any way you look at it, computer games are only going to get better.

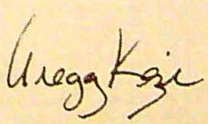
This is Apple Applications' Games issue, and we've got a selection of articles and type-in programs on that topic. Tom Netsel's "How Real Can You Get?" looks at simulations and their impact in education. When children can pretend to be pioneers in the American West or pirates in the Caribbean, what does that do for teachers and for learning? "New Vistas: Hot Games for the Apple IIGS" uncovers a well-kept secret—the Apple IIGS is a great game machine with a great game library. The article's accompanying buyer's guide lists nearly 50 IIGS-specific games already out or out by the time you read this.

And as always, we've got some great type-in games for you to play on your Apple. Tim Victor's conversion of "Basketball Sam & Ed," a strange, but terribly entertaining two-player game, is the best arcade Apple Applications has ever done.

Jenny Schmidt, a frequent contributor, offers "Mosquito Madness," a simpler (and shorter) arcade game that keeps your fingers flying. Games can teach, too, and "Help Letters Survive!" certainly does that well.

Of course, there's more to this issue. Regular columns like "Readers' Feedback" and "Apple News & Notes." More programs, like the planetarium simulator "Stars." Insightful features on *HyperCard*, and tax preparation software from authors like David Thornburg and Dan McNeill.

Computer games make it easy to have fun, and make owning an Apple II an entertaining experience. Have fun with this issue.



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Putting Its Money Where Its Mouth Is

Apple's just-released 1987 annual report is slick. Four-color photos of Apple computer users and company officers grace the report's 58 pages. The paper is glossy and heavy. The design is clean.

What's under the cover is what counts, however. And according to Apple, it's counting 1987 as a very good year.

Net sales for the fiscal year ending September 25, 1987 were up 40 percent over last year, making Apple Computer, Inc. a $2.66 billion company, the first time it's cracked the $2 billion mark. After-tax income rose by a similar percentage to an all-time high of $217 million.

Spending in several areas matched or exceeded those increases. Research and development, a vital part of any computer company, went up almost 50 percent to over $190 million. Marketing and distribution (to pay for such things as those flashy commercials you see every Sunday morning on the national network's press shows) was up over, way over, half a billion dollars.

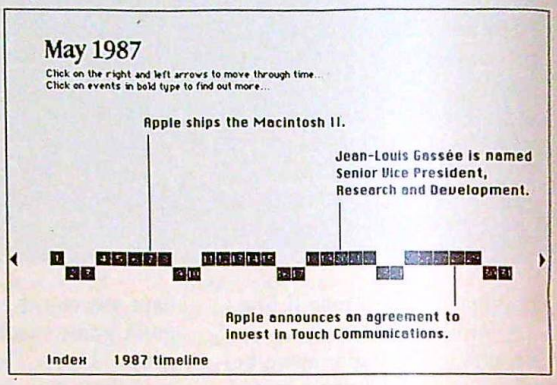
The result of all this money coming in and going out? Lots and lots of computers disappearing from dealers' showrooms, that's what. New releases made the biggest noise, of course, and included the Macintosh SE and Macintosh II for 1987. It was hard to notice any new Apple II-oriented hardware or software in all the Macintosh hoopla, though.

One of the year's biggest Apple releases—as far as the press it's gotten and continues to get—is *HyperCard*. Developed by Apple Fellow Bill Atkinson, designer of the paint program standard *MacPaint*, *HyperCard* has been called a software erector set, a coursework authoring package, an information-retrieval system, and, by David Thornburg in this issue, a way to more easily program sophisticated applications (see "*HyperCard*: Programming Without Pain").

Whatever it is, or will become, *HyperCard* has caught the imagination of Macintosh owners and has made Apple II users jealous. It also has let Apple put its money where it's mouth is.

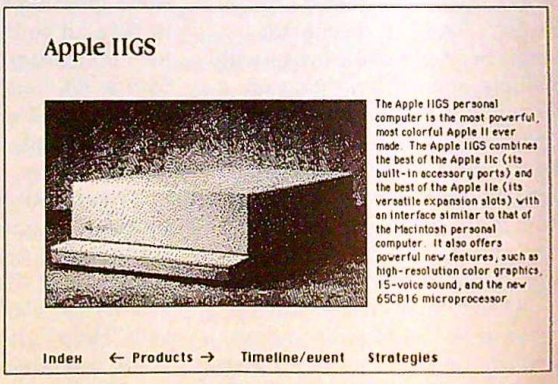
Along with the 1987 annual report comes a 3½-inch disk: the *1987 HyperCard Supplement*. Run *HyperCard* and click on the single file on this disk, and you're treated to an informative, albeit unusual, way of following Apple's year. After a brief introduction signed by John Sculley, President and CEO of Apple, you see icons at the bottom of the screen:

Figure 1



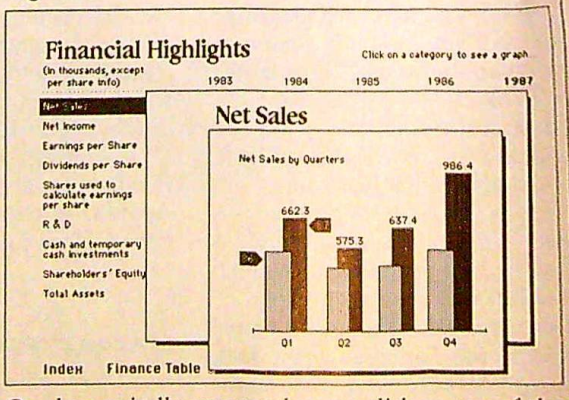
In this part of the HyperCard *supplement to Apple's annual report, clicking on any of the boldfaced type brings up another screen of information.*

Figure 2



Digitized pictures and information on significant Apple products are just a click away.

Figure 3



Graphs magically appear when you click on any of the 1987 totals in the Financial Highlights *section.*

Timeline, Products, Finances, Strategies, Markets, and Quit. Click on any icon, and you're on your way to a *HyperCard* annual report.

Pick Timeline, for instance, and you'll see fiscal year 1987 spread on the screen. Click on any of the months, and you'll get a detailed look at what happened when (Figure 1). Click on one of the boldfaced phrases to get even more information.

There are surprises everywhere. At the top right of the first Timeline screen, you can click on a box which brings up a graph of Apple's stock price over the past 12 months. Click in another box, and you can even enter a date for the exact price at that time. Click on the left arrow to go backward in time, through 1986, 1985, and 1984. Want to know more about Del Yocam, Chief Operating Officer? Click on his name; a digitized picture of Del appears, along with a short bio.

The entire Apple Computer line is available in Products. Choose a category—Apple II or Macintosh, for example—and more selections magically appear. Click on the Apple IIGS to see the computer and read a description about it (Figure 2).

Finances charts the company's money for the year in several areas. A spreadsheet-like form fills the screen, and, when you pick one of the lines, a window opens holding a bar chart comparing 1987 with 1986. Click to see a quarter-by-quarter breakdown (Figure 3).

Strategies gives you more insights into Apple's plans, while Markets relates the company's success overseas.

The *HyperCard Supplement* can be looked at in two ways: a great way to use a product that informs as it illustrates Apple's technical prowess, or a stunt done simply to draw attention to *HyperCard*. Better yet, maybe it's both.

No matter. For people who enjoy using computers (and most readers of Apple's annual report would fit that description), navigating through a *HyperCard* stack is a lot more fun than reading the most colorful report. Look for copycats soon, both from Apple third-party developers and from the MS-DOS world when it decides on a hypertext standard. Imagine an IBM report in hypertext. Mindboggling.

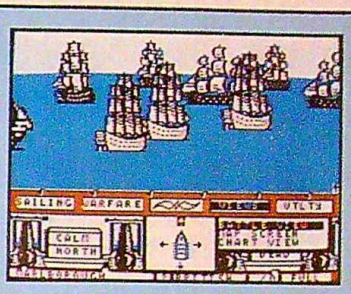
Apple II Publisher's Newsletter

Where desktop publishing shows its face, newsletters are sure to follow. One of the newest Apple II newsletters makes good on that promise, but with a difference: This newsletter is about desktop publishing.

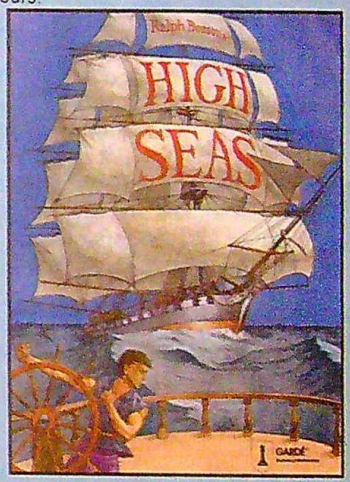
Sage Productions, publishers of the better-known *AppleWorks Journal*, is scheduling the *Desktop Publishing Newsletter* for a February premiere. The newsletter will cover such topics as desktop publishing hardware and software, publication design, and more—all revolving around the Apple II line.

It's time for such a publication, for in the last two months, two Apple II desktop publishing programs have been thrown into the market—Timework's *Publish It!* and Softsync's *Personal Publisher*. Other products are to make an appearance in early 1988, including *Springboard Publisher* (Springboard), *Melody* (Millikan), and *geoPublish* (Berkeley Softworks). Digitizers are already popular with Apple II (especially Apple IIGS) owners, and *PostScript*-compatible printers are dropping in price (*PostScript* is the most common and best-supported page-description language built into laser printers). When *PostScript*-equipped laser printers fall under $2,000, they'll be looked at seriously by Apple II desktop publishers. Desktop publishing is the hottest topic in the Apple II world.

For more information about the *Desktop Publishing Newsletter*, contact Sage Productions at 5677 Oberlin Dr., San Diego, CA 92121, (619) 455-7513.



From the crow's nest, your topman bellows, "Enemy ship ahoy!" You immediately order battle sails, your guns loaded and prepared to fire. You change your course in anticipation of your enemy's next move. Now, the wind is in your favor, and so is lady luck. Before the enemy captain can bring the ship about, you level a broadside amidship; crushing her main mast, taking sails and rigging down with it. She's dead in the water gunports blocked by the fallen mast and sails. Your next broadside explodes into her hull, ravaging her decks; then another until finally, she strikes her colors. The prize is yours.



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Here's what Neil Shaprio has to say from the November 87 issue of Nibble

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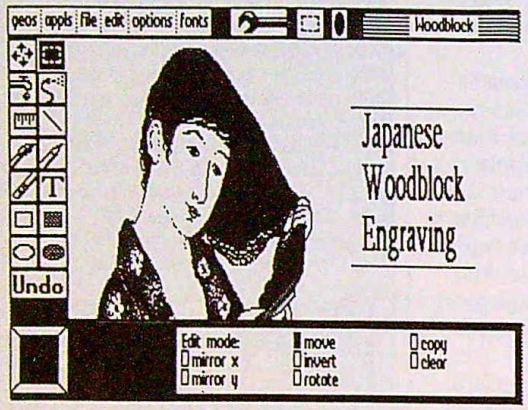
Make Your Apple Look Like A Commodore 64

Berkeley Softworks, a company famous for bringing a graphics interface to the Commodore 64 and 128, has just released its *GEOS* operating system and some of the accompanying software for the Apple II.



GEOS's geoPaint *looks remarkably Mac-like.*

What's *GEOS*, you say? If you know little of the Commodore 64 (a condition many Apple owners find themselve in), let's fill you in.

GEOS is, first and foremost, a disk operating system. The Commodore 64 never had a disk-based DOS, since the operating system was built into the hardware, in fact, into the notoriously slow disk drive. *GEOS* speeds up disk access five to seven times.

Instead of the arcane commands required to manipulate files on the 64 (a stranger command syntax than ProDOS, if that's possible), *GEOS* offers a mouse- or joystick-driven interface that looks surprisingly like what the Macintosh made so popular. The *GEOS* desktop includes icons, pull-down menus, and windows. Applications which support *GEOS* look much like all other graphics-intensive software, with a menu bar across the top, pull down menus accessed from the bar, and bit-mapped screens for a what-you-see-is-what-you-get affect.

Sound familiar? If you've seen the Apple IIGS *Finder* and IIGS-specific ProDOS-16 applications, you have a good idea of what makes up a graphics interface. Apple IIe and IIc owners may have seen similar interfaces in *Catalyst* or *MouseDesk*, two older packages which tried to bring the Mac look to the 8-bit Apple II's.

What, then, distinguishes *GEOS*, and why did Berkeley bring it to the Apple II environment? After all, the IIGS is certainly Apple Computer's darling of the II line, and seems to be pointing the way toward the future of Apple II computing.

Answering the second question first, Brian Dougherty, CEO of Berkeley, in an interview at the Winter Consumer Electronics Show in early January, pointed at the large installed base of non-Apple IIGS Apple II's. Those Apple II+, IIc, and IIe computer owners make up a huge market, Dougherty said, and Berkeley believes they'll look hard at *GEOS*. Why? Because they want to participate in the new look of computing (the graphics interface), and because of the applications that *GEOS* supports, applications which offer the best performace for the price, claimed Dougherty.

Berkeley offers several programs with its introductory *GEOS* Apple package, including a word processor *(geoWrite)*, graphics *(geoPaint)*, spell checker *(geoSpell)*, desk accessories, and a laser print driver. Those programs, and others, are already up and running on the 64. Moving them to the Apple II (which uses the same 6502 family of microprocessors as the 64) takes only weeks, not months, said Dougherty. That's where *GEOS* has a big advantage over other graphics interfaces for the II line—there are a number of significant programs and utilities already written for *GEOS*.

At $129, how many Apple owners are going to take on *GEOS*, though? A lot, hopes Dougherty. He sees a market in the

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educational arena, where Apple is king, and where there are huge numbers of IIe machines. To entice educators into considering *GEOS*, Berkeley will be releasing a network which will link Apple II and Commodore computers to an IBM PC running as a file server. The network, in testing for the first six months of the year, will be electronically compatible with AppleTalk, so if Apple ever does put an AppleTalk network together for Apple II computers, Berkeley won't be left in the cold. Doughtery wouldn't confirm that Berkeley is working to link IBM and IBM-compatible computers to this network.

With such a network, schools with a variety of machines—from IBM, Tandy, Apple, Commodore, and a host of MS-DOS clone manufacturers—could tie them all together. Better yet, all the computers could use the same interface (a tremendous savings in teaching time) and the same primary applications (ditto).

Schools, then, may have an excellent reason for buying into *GEOS*. Consumers in the home may not see the light so quickly. *GEOS* doesn't support color, so its applications are in monochrome. Many Apple owners already have expended money and time in acquiring and learning applications that serve the functions of some of the *GEOS* programs. *AppleWorks* is a good example, for its word processor, spreadsheet, and database take care of three of the *GEOS* packages presently available on the 64. Paint programs like *Dazzle Draw* are superior to the *GEOS* offering on the Apple.

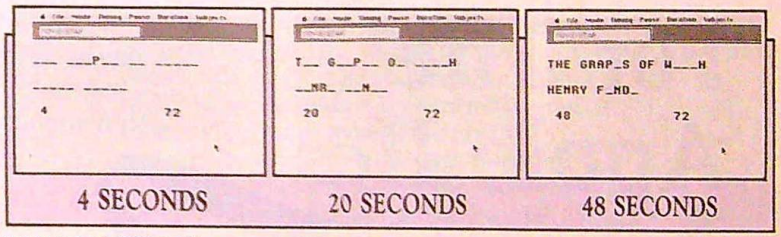
One thing that helped *GEOS* immensely in the 64 world was Commodore's endorsement of the operating system and the bundling of *GEOS* with all Commodore 64 computers. It provided an instant base for *GEOS* and instant credibility. Will the same thing happen with Apple? Berkeley was to meet with Apple in January to talk about that, Dougherty said. They would bring up the idea of bundling *GEOS* with Apple IIc and IIe computers, he said, though he didn't think success likely.

Quick Notes

HyperCard DA, an impressive desk accessory for the Macintosh, was announced at MacExpo in January. Published by Symmetry Corp., *HyperCard DA* allows access to many *HyperCard* stacks while users are in other applications, and it even makes it possible for Macintosh 512K owners to read stacks. Much of the early criticism of *HyperCard* lay in the fact that users could best benefit if they had two megabytes or more of memory so *HyperCard* could operate at the same time as a major application. *HyperCard DA* addresses some, but not all, of these restrictions.

Paintworks Gold, an enhanced version of *Paintworks Plus*, has been introduced by Activision for the Apple IIGS. *Paintworks Gold* adds more than 80 new features to *Paintworks Plus*, including color masking, three-dimensional perspectives, gradient color blending, color cycling, and more. Positioned as a head-to-head competitor with Electronic Arts' popular *Deluxe Paint II*, *Paintworks Gold* retails for $99.95. Registered owners of *Paintworks Plus*, however, can upgrade to *Paintworks Gold* for $20 through May 31, or for $40 anytime after that. Upgrades will also be made available to owners of competitive IIGS paint programs (like *Deluxe Paint II*) for $40.

John Madden Football has been announced by Electronic Arts for the Apple II line. In the same expert celebrity vein as *Chuck Yeager's Advanced Flight Trainer* and *Earl Weaver Baseball*, this football simulation/game offers a menu-driven system of calling actual Madden plays. With impressive graphics, *John Madden Football* even lets you build your own playbook with a simple-to-use play editor. The game sells for $44.95. aa



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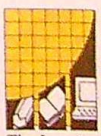
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New Vistas

Hot Games For The Apple IIGS

Gregg Keizer

The IIGS is Apple's best and brightest II. At no time is that truer than when you play games. The machine has opened new vistas in gaming on Apple computers, new visions of sports, combat, adventure, and fantasy. Here are seven of the hottest IIGS games.

Everyone says that they bought the computer to do work. That may be office work, homework, or school work, but it's all still work.

They're lying.

You may have told yourself you were buying the expensive Apple IIGS so that you could use Macintosh-like word processors, increase the speed of such stalwart packages as *AppleWorks*, and draw exquisite graphics in over 4,000 colors. I told myself much the same thing. I lied to myself.

The IIGS in my home is a game machine pure and simple. A great game machine, whether it's running game games or educational games. I've owned game systems and game-oriented computers, and I've used every personal computer from the Amiga and Atari ST to the IBM PC and Macintosh to play games. But the Apple IIGS—for several reasons—must be considered the first choice among gamesters.

Hot Hardware, Hot Software, Hot Numbers

The first reason for the IIGS's gaming abilities is, of course, the computer itself. It has hot graphics and even hotter sound capabilities. Animation, though not up to the standards of a 68000-based machine like the Amiga (which has graphics-dedicated chips to process animation), is more than acceptable. Generally, IIGS game amination is smooth and flicker-free. The IIGS's raw speed, twice that of an Apple IIe or IIc, is enough to push most games, even if it's sometimes canceled by the higher resolution graphics used by the upper-end programs. Player control can range from perfect to pathetic, depending on the game. Part of this is due to the mouse, which is well-suited for

point-and-click kind of games, but not for fast-action arcades.

The second reason for the IIGS's fine game play is the available software. It's taken time, but developers have responded to the challenge of programming games for the IIGS. Most (as you'll see shortly) are translations from popular existing games. A few are new to the IIGS. Overall, the quality is high, both in playability and in appearance.

The last reason to seriously consider the IIGS as a game computer is that it's an Apple. Because the machine can run older IIe/IIc games, as well as the newer, flashier IIGS-specific programs, you can have the best of two worlds. Don't underestimate the importance of this. For an idea of how vital it is to keep lines open with a company's past, ask Amiga owners if they'd like to run Commodore 64 software (and no, Amiga owners *can't* run 64 stuff on their hot, new computer). It may take time before all your favorite games are ported to the IIGS. Some may never make it, perhaps because they were written long ago or don't depend heavily on looks. That's why the split personality of the IIGS makes it an even more effective game platform.

And since the IIGS *is* an Apple, you can be sure it will be supported by an increasing number of software publishers. The Apple IIGS is going to be around for awhile (more than a quarter of a million units were sold by the end of 1987), an important consideration when developers often spend over a year working on a program.

Two Dozen Choices

By the end of 1987, there were more than two dozen games specifically written for the Apple IIGS, available from a number of the best-known entertainment publishers. You'll find those games, and a number of promised releases, listed in the buyer's guide accompanying this article.

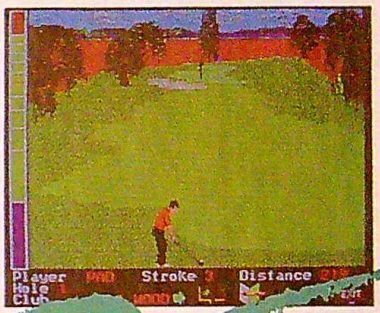
Those two dozen games represent just the beginning of the IIGS gaming world. From all indications, 1988 will be a banner year for super-hi-res, super sound games. For now, though, the pickings are slimmer.

That doesn't mean you can't find games which take complete advantage of the machine. Nor does it mean you have to settle for second-best game ideas. In the two dozen games now on the shelves you'll find some of the most popular titles around.

In fact, there are a number of excellent IIGS games to lead off your library. Seven in particular are top-notch programs that every serious IIGS game player will want to boot up.

Hot Sports

The best sports game for the Apple IIGS has to be Accolade's *Mean 18*, a true-to-life golf simulation. From the opening screen, when you hear a voice say *Accolade presents* to the tee-off on the first hole, the graphics and sound say *IIGS*.



You have three courses to choose from in *Mean 18*—Augusta National, Pebble Beach, and St. Andrews, with more offered on optional Famous Course disks. *Mean 18* puts you in complete control of your golf game. Before you tee off, for instance, you can hit at the driving range, practice putting, even play a hole.

Choose a level of play, select the course, and pick your club. Hitting the ball takes some dexterity with the mouse, the sole device used to play *Mean 18*. You watch a sliding bar on one side of the screen, time two clicks of the mouse to set power and wrist snap, and then sit back and watch the ball fly. It sounds hard, and at first it is, but with time and practice, you'll quickly be making par, then birdies.

Mean 18's screens are attractive, though not dazzlingly so. The shapes for trees, bushes, buildings, and sand traps are somewhat blocky. Animation is restricted to your golfer, who swings more smoothly than many real players. Sound is one of the highlights of the game, however. The *swoosh* of the club through the air, the *clunk* as the club meets the ball, and the *plunk* when it lands in the grass are all there. Hitting trees, trunk or foliage, produces different sounds. The invisible gallery applauds and shouts when you make a particularly good shot and moans when you just barely miss a long putt.

Mean 18 doesn't account for wind, but that's its only shortcoming. The courses are comparable to their real-life counterparts, but don't expect to recognize many landmarks on most. One tree, after all, looks much like another.

And if you don't like the offered courses, you can use the included golf course architect to design your own. Like good IIGS software, you point and click as you putt down fairways, traps, greens, rough, trees, and shrubbery. You even decide where on the green to place the pin. It's all grand fun, especially when you share courses with other *Mean 18* golfers. In fact, some of the commercial information services, such as CompuServe, have *Mean 18* courses avail-

able for downloading.

Mean 18 uses the IIGS's capabilities, an important consideration when looking for the top-quality games. The mouse is the right tool for the game and seems perfectly natural. Graphics are clear (on the RGB monitor, anyway) and the sound is excellent. As a game, *Mean 18* succeeds because it lets you compete against other players (up to four) or against yourself in a setting that many people are familiar with, but few are good at. Everything in the game—from club choices to timing your swing—is a necessary part of shooting under par. Let your concentration stray for only a moment and you'll slice or hook the ball into the woods or water. Golf isn't a terribly physical game (how can it be when you can ride from hole to hole?), but it *is* one of mental toughness. *Mean 18* duplicates that as much as can be expected.

Sports games are hot right now—the genre regularly appears on software best-seller lists—and packages like *Mean 18* make it easy to see why.

Hot War

Computer games with military themes have always been popular. Originally based on board war games, today's computer conflict simulations are both more sophisticated in their play and snappier in their appearance.

Silent Service is a recent release from Microprose, a company that has made its bones with combat software such as *F-15 Strike Eagle* and *Gunship*. *Silent Service* is an integral part of the company's success. Of the several submarine simulations on the market, *Silent Service* consistently heads the popularity charts.

Now this realistic (for the most part, and about as much as one can ask from a game) simulation game comes to the Apple IIGS. You captain an American submarine in the Pacific during World War II. Prowling for Japanese merchant ships and warships, your task is to send as many of the enemy vessels to the bottom without losing your boat to some ace sub killer.

Silent Service lets you choose from a variety of levels and set a number of options, from dud torpedoes to aggressive enemy destroyer captains. Short one-convoy games can be played in an hour or so, while longer games simulate an entire patrol.

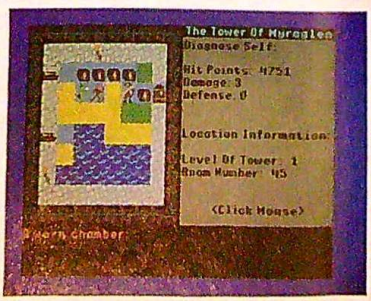
With the exception of the completely mouse-driven interface, *Silent Service* for the IIGS works much the same as the versions for the older 8-bit computers. Several game screens are accessed through a control-room display by moving the submariner up to the bridge, over to the periscope, beside the map/radar table, next to the instrument panel, or down into the main body of the sub. Once on the bridge or at the scope, you can look for enemy shipping, scanning the horizon for black dots. Firing torpedoes and the single deck gun is done with a click, sometimes dangerous if you mistakenly click and fire the gun when all you meant to do was turn your binoculars slightly as you crept up on an unsuspecting convoy.

Graphics and sound are, on the whole, below current expectations for IIGS games. *Silent Service*'s look and sound are more in line with other, older versions of the program. Graphics are in many cases blocky and the sound effects are almost primitive. The grating noise heard as a torpedoed ship goes down, for instance, has none of the richness you'd expect to hear when bulkheads give way and metal twists. The best effect is the klaxon as you prepare to dive.

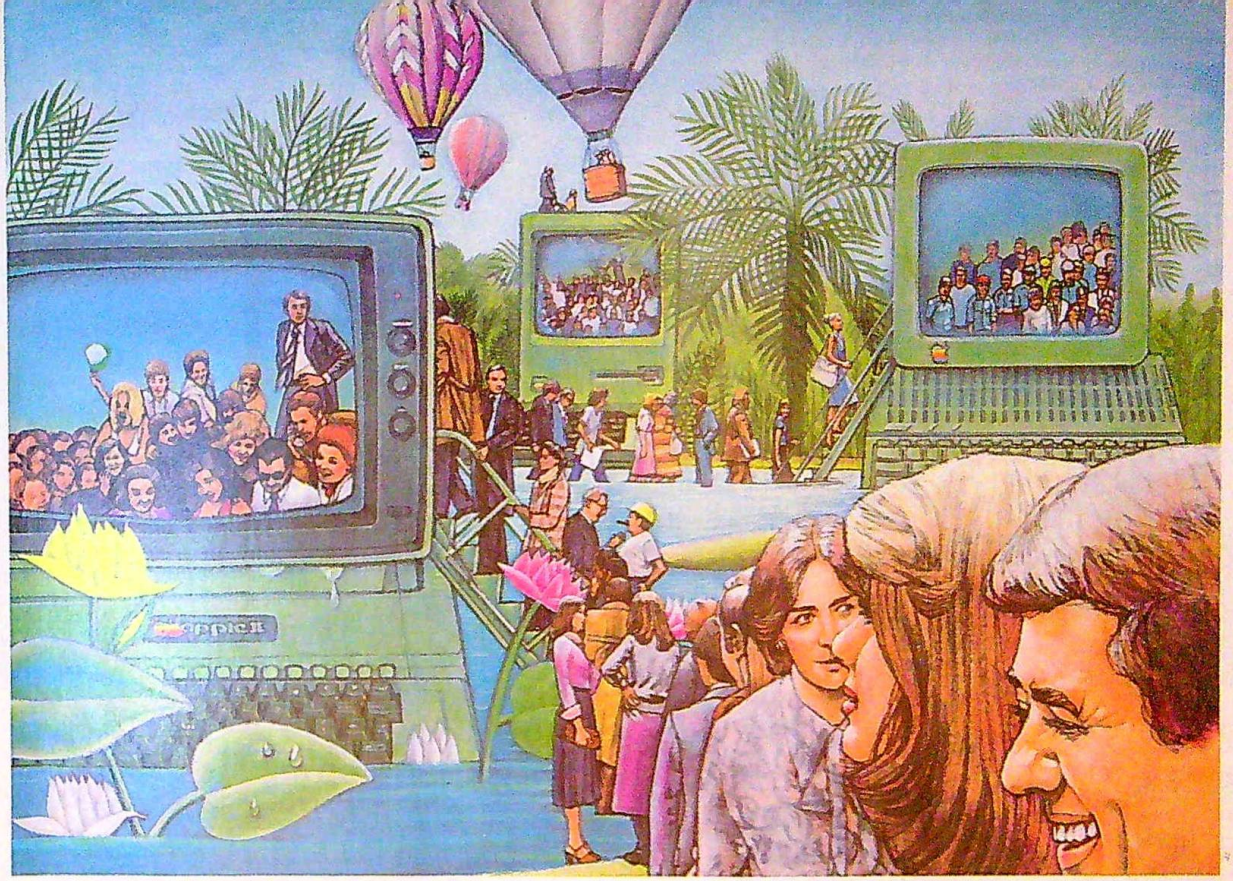
Even though *Silent Service* may not be the peak of IIGS graphics design, it's still an excellent game. All the reasons it became a best-seller on the Commodore 64, Apple II, IBM PC, Atari ST, and Amiga hold true here as well. The game is fun to play because there's a sense of realism, of being somewhere you never can be (and probably wouldn't want to be even if you could). As in real submarine combat, patience is rewarded, recklessness is punished. Stalking a convoy one moment, desperately diving and turning to avoid a depth charge attack the next, you get to experience the spectrum of undersea warfare. And when you succeed in getting past the escorts and manage to sink that fat tanker, you'll feel a sense of accomplishment of a job well done.

Hot Sound

Billed as an action-adventure game, PBI Software's *Tower of Myraglen* is nearly an arcade game. You play the part of a Knight exploring the rambling Tower of Myraglen in search of the Medallion of Soul Stealing. Fail in your quest, and the world falls under the sway of Arch Evil Sir PunDragon. (Don't all failed quests have this kind of ending?)



You're well equipped to handle the tower's occupants—an assortment of nasty things like slime creatures, giant rats, skeletons, and other weirdnesses. The Rind of Unlimited Arrows fires in every direction, you have a sword for hand-to-hand fighting,



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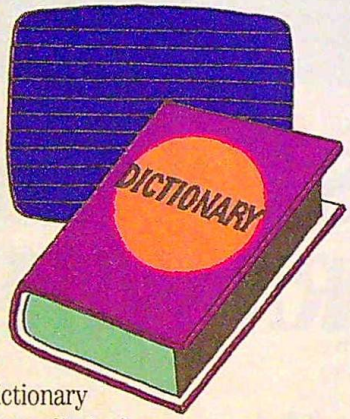

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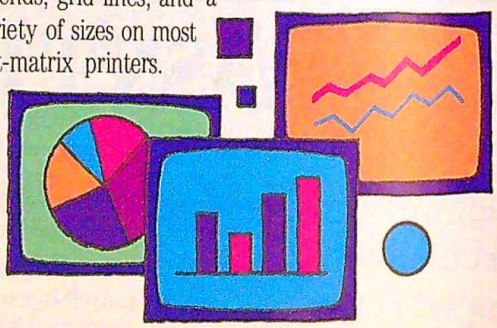

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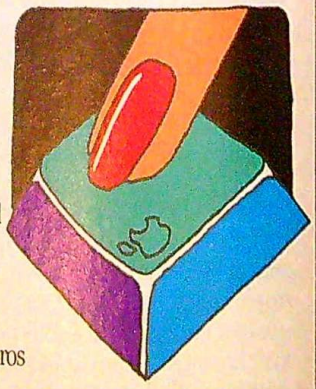

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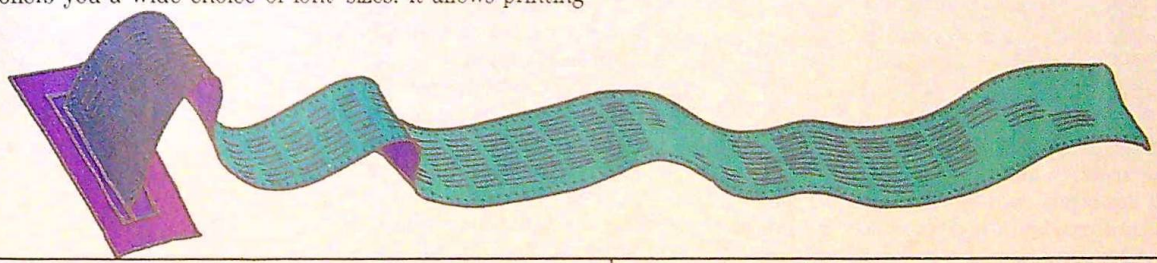

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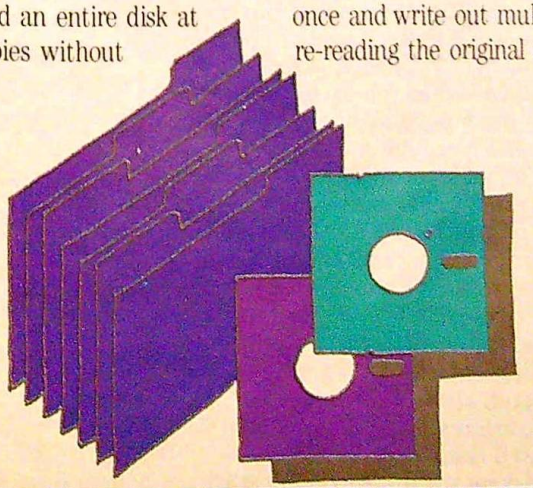

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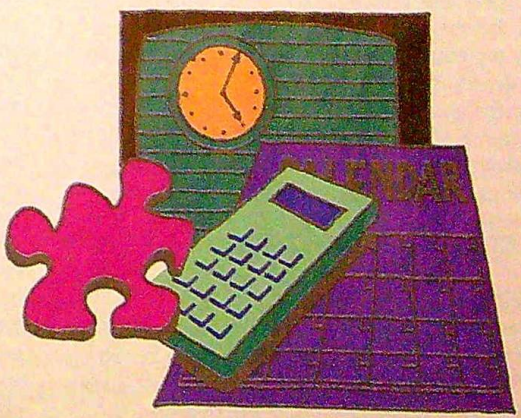

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and even armor. Swords and armor can be upgraded when you find better samples in the many treasure boxes scattered throughout the tower.

Each of the tower's seven levels includes at least one puzzle which must be solved to move on. They're not as difficult as true text-adventure games, which depend heavily on such things, but they can stump you if you're not methodical in your explorations.

You control your Knight with both the mouse and keyboard, not always a workable combination. Such simple matters as opening a treasure chest and taking its contents requires two keypresses, two mouse movements, and two clicks of the mouse. A much simpler method would have been to simply double click on a chest to open it, then perhaps a drag of the mouse to take the treasure. Moving and fighting under mouse direction is also rough at times. You can select keyboard-only control before the game starts, but that requires two hands on the keyboard.

Sound is the key to *Tower of Myraglen*. From the opening title track (most impressive) to the individual sounds of the twitchy Tower things (still good), sound makes this IIGS game what it is. Graphics are passable, though not dazzling; combat uninteresting; and conversation a minor part of this game. Sound effects, though, rescue *Tower of Myraglen* from the back of the game shelf. You'll hear the squish of the Slime and the moan of the Skeleton as you come across these creatures, and more. Doors and treasure chest lids creak, your footsteps ring off the rock corridors, and the clock strikes the hours.

All these noises can be heard well enough through the IIGS's internal speaker, though some may sound tinny. They're reproduced with better results when you have an MDIdeas' SuperSonic card installed in the computer and speakers or headphones connected.

Tower of Myraglen shows some of the IIGS's potential in the game sound arena, and for that reason, must be considered one of the computer's hottest games. Neglected by too many developers in too many Apple II games, sound can be a vital part of game design and game play. Turn off the sound in *Tower of Myraglen*, for instance, and you'll quickly notice its contribution. Without it, the game becomes a software version of a silent movie.

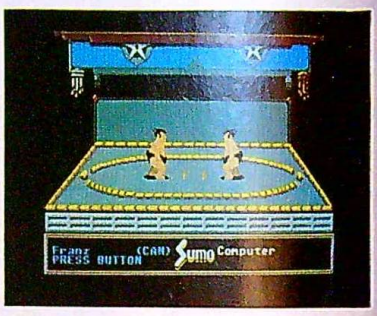
Hot Translation

Many of the games up and running on the Apple IIGS first made an appearance on another computer. It was their earlier successes that led their publishers to the decision to translate, or *port* the game to the new Apple II.

One such program is *World Games*, from Epyx. Best known for the other chart-topping packages in the series—*Summer Games*, *Winter Games*, and most recently, *California Games*—Epyx moved early in IIGS development. Among the first results, more than a year after the machine's introduction, is *World Games*.

Eight international events, most not in the Olympics, form *World Games*'s agenda. Up to eight players compete in such locales as Scotland, Japan, Mexico, and the U.S.A. for medals and the chance to hear the right national anthem played. Weightlifting, barrel jumping, cliff diving, slalom skiing, log rolling, bull riding, caber tossing, and sumo wrestling fill the card of events. Each requires its own skill and strategy.

The bull riding competition, for example, is held in the Southwest United States, Monument Valley–like mesas rising in the background. You select one of five bulls (from the tame Ferdinand to the bone-shattering Earthquake), then try to stay on for the required eight seconds. The bull tries to buck and spin you off while you furiously pound keys or wiggle the joystick in the right direction to keep your seat. Stay in control, and you dismount with grace; fall off, and the bull laughes in the best cartoon style.



Some events, like cliff diving, are easy. Others, like sumo wrestling, skiiing, and barrel jumping, are not. All share good to excellent graphics and animation. Sound is of uniformly high quality, especially the various national anthems and crowd responses. Game control, though, is often frustrating if you don't have a joystick. *World Games* doesn't make use of the mouse, and instead expects IIGS owners to own a joystick, not a likely part of many systems. You can use the keyboard, but you'll get hands and fingers crossed at the worst times. Barrel jumping in southern Germany, for instance, is a nightmare on the keyboard as you try to press the J and K keys in rhythm with your skater's legs.

World Games gets high marks for several reasons. The game is entertaining. Good multiple-player computer games are rare, but *World Games* puts you head-to-head with as many opponents as you can handle. The events themselves are unusual, not the normal Olympic competitions that everyone sees on television. Winning medals depends on your coordination and timing at the joystick or keyboard, about as close to the physical requirements of the real thing as you can get on a computer.

Epyx has done a fine job moving the game to the IIGS. Graphics are sharper than

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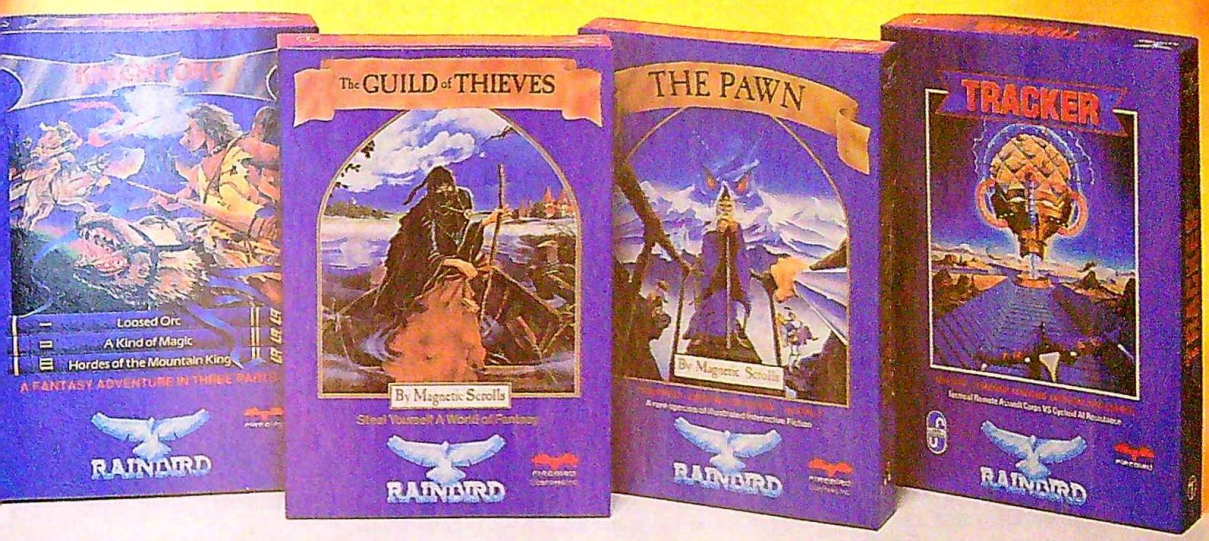

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those found in the 8-bit versions and are comparable with the 16-bit versions. Sound has been enhanced and the IIGS's abilities have been used if not pushed to their limits. Best of all, the flavor and playability of the game has been retained. If you liked *World Games* in its orginal incarnation, you'll love it on the IIGS.

Hot Arcade

No doubt about it, arcade games are still a big part of the computer game world. Years after they made the trip from video arcade centers to the home video machine to the home computer, shoot 'em ups and run-and-jumps make up a substantial part of any personal computer's software library.

The Apple IIGS isn't really any different. Several arcade-style games already exist on disk, more are arriving, and even more are on the drawing boards. *Thexder*, published by Sierra On-Line, is the best example now around.

Originally designed in Japan, where it's a big arcade hit, *Thexder* exists in a simple game environment. You control Thexder, a robot that can transform itself into a jet (just like the famous children's toys, Transformers). Sixteen levels are open to exploration—the last holds the central computer, which Thexder must destroy. Of course, there are all sorts of strange things lurking about the cavernous levels, each slightly different in appearance and favorite method of destruction. With names like *Golan*, *Centibeet*, *Balder*, and *Rimquart*, the aliens are memorable if nothing else.

Thexder's energy level sets the tone for the game. Expend energy by firing at the nasties or being touched by them. Increase energy by destroying certain of the creatures—you have to find out which ones. So far, all pretty standard stuff in arcade game history.

Thexder excels at this straight-forward approach to action arcade games. The basic skeleton—game design and play—may not be anything spectacular, but it's fleshed out magnificently. From the moment you're introduced to the game by a Japanese-accented voice to the time you disintegrate under attack by bouncing Balders, the sound is of the highest quality. Music plays constantly in the background (sometimes irritatingly so), but changes with the drama of the moment. *Thexder* looks good, perhaps better than any of the other games discussed here. Much of that can be traced to the original game design and the Japanese penchant for artistic arcade games that look as good as they play. Animation is excellent, with smooth movement of the robot's legs and even smoother transformation from robot to jet aircraft.

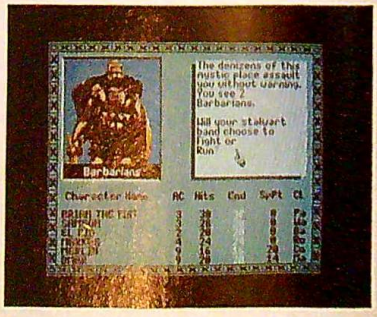
Action is the key to any successful arcade game. How fast and furious that action attacks the player means the difference between a limp game that gets played a half-dozen times and a game that eats up the hours. *Thexder* is in the latter camp. The creatures/aliens rush at Thexder in waves and often it's only by madly dashing from one side to another that the robot survives. Discovering the individual dangers of the different creatures is much of the game's charm. Finding ways to fend them off completes the challenge.

Thexder suffers from some problems, notably the awkward keyboard control. With eight directions of movement possible, it's strange that the programmer picked the keypad for control. Most players end up punching the wrong keys at the worst times. Joystick or mouse control would have been far better.

Other glitches include a nonbooting disk, forcing you to boot a System disk, then click on the Thexder icon from the Finder's desktop. More troublesome to avid players is having to return to the opening title screen to play another game. When you're beginning the game, this waste of time (and reloading of much if not all of the program from disk) is baffling. If you have a ramdisk with enough room, put *Thexder* in it and run it from there. You'll save a lot of time.

More than half a million copies of *Thexder* have been sold in Japan. Whether Sierra can duplicate that kind of success in the U.S. remains to be seen. The game may have little current competition, but innovative game design and attention to detail could push *Thexder* from center stage. For the moment, though, this arcade game is as good as it gets on the IIGS.

Hot Adventure



Adventure games have been a staple of personal computers ever since the days of *Zork*. Whether it was by puzzling out devious messages or by fulfilling a quest, role-playing games brought magic, dungeons, demons, courage, and combat to the small screen.

Electronic Arts' *The Bard's Tale* was one of the first games to make it to the Apple IIGS. Almost a year later, it's still the premiere adventure game for the machine. *The Bard's Tale* is a graphics adventure, not a text-only program of parser and keyboard pecking. The game includes superior super

hi-res visions of the infamous city of Skara Brae, its inhabitants, your party of brave travelers, and the hordes of *things* you find behind almost every door and around almost every corner.

Equip a hearty band of six for the dangerous exploration of the city. Characters on disk are provided, or you can create your own. Once you enter the city, the screen offers two windows. On the left is the view into this world—here you'll see buildings and streets, dungeon corridors, evil creatures, and the men in your party. On the right is the window where messages and menus appear, as well as blow-by-blow accounts of combat when you begin swinging swords. Play can be completely carried out with the mouse, although you can enter most commands from the keyboard if you want.

Goals and methods of obtaining them are simple as adventure games go. Search through the city, both above and below ground, seeking out the evil Mangar who threatens the city. Dispose of his henchmen when you find them, grow stronger and wiser as you live and learn, and if all works out, free Skara Brae from the clutches of darkness. Whew!

Getting there in *The Bard's Tale* is all the fun. Play mechanics are as intuitive as the IIGS can make them. Point and click in the cityscape to move from place to place, down one street, into this house, around that corner. When you stumble upon bad guys, click to fight or run. Click to choose who fights, who defends, who hides, and who makes magic. Your spellcasters select the spell of choice from a menu, again by mouse pointing and clicking. You don't have to touch the keys.

The graphics are outstanding, although they're in the style of photographs, not movies. Don't look for exquisite animation here. A jaw may flex, an eye may move, but that's about all. Except for the opening, sound is not used.

Why tout *The Bard's Tale* on the IIGS then? Frankly, it's a good game on any computer, from the Commodore 64 to the Apple IIe. On the IIGS, it's in its cleanest, most seamless form. As the graphics entrance you and you easily take care of game mechanics with the mouse, you'll sink quickly into the reality of Skara Brae. Losing oneself in a game was never easier.

Hot All Around

Even when there's only two dozen games to choose from, it's a conceit to think one can choose the best. After all, everyone looks for different things from computer games. What burns a hole in one player's monitor screen may be a unused disk for another.

Yet *Shanghai*, from Activision, is certainly the best IIGS game currently available. *Shanghai* plays slow, it has no sound, and it involves no computer-generated danger. But it's as addicting as computer games can get.

Loosely based on Mah-Jongg, *Shanghai* is a strategy game, pure and simple. When you boot the game, you look at a colorful screen showing 144 stacked rectangular tiles. You're looking down on the stack.

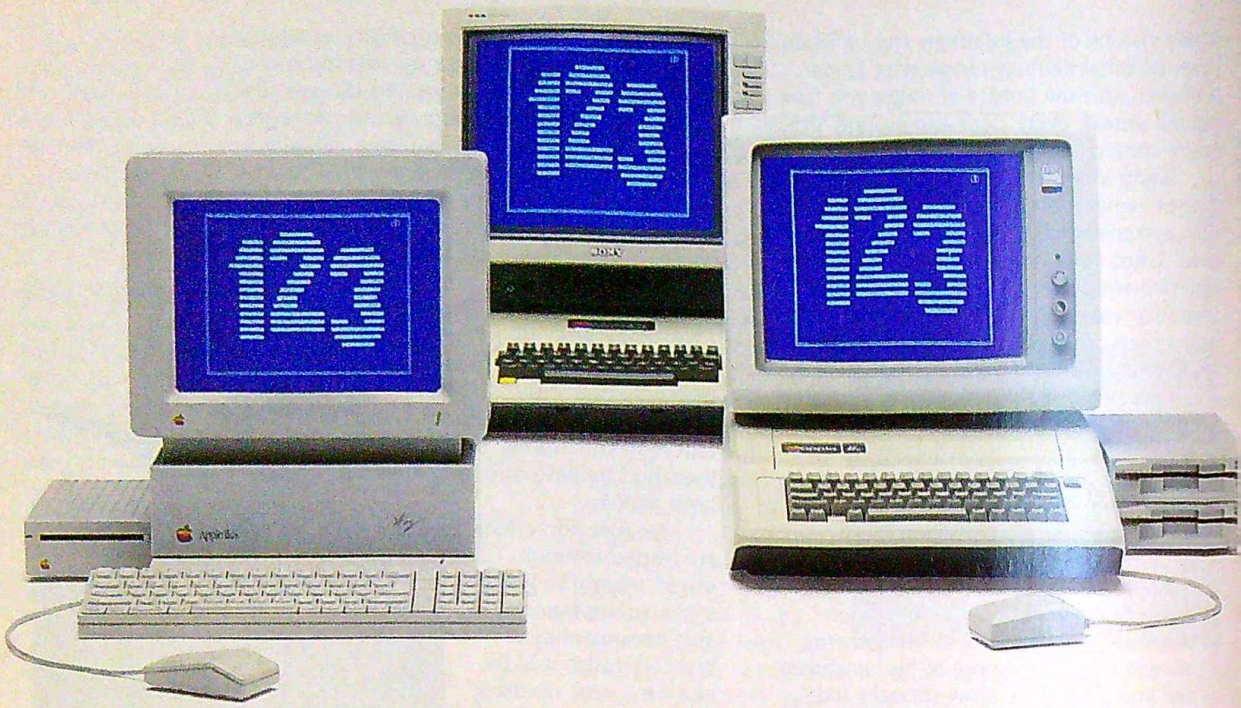
Using the mouse, you point and click on tiles to remove them. The goal is simple: Clear the screen by removing matching tiles. The rules are just as simple: You can remove matching tiles only when both are open—that is, neither tile is blocked at both its left and right by another tile. Click on a tile, then find its twin and click on that to make both vanish.

Because some tiles are buried beneath others when the game starts, or are inaccessable because they're blocked in the middle of a row, your opening moves are determined by the luck of the tile shuffle. The key is to search diligently for the right pair to remove, thinking several mouse clicks ahead if you can. Seeing a number of moves down the road is a big part of *Shanghai* and makes it such a thoughtful game.

You can play against another person with limited time for each move, play in teams, even play in a tournament by seeing who can remove the most tiles in the designated time. Solitaire play, though, is the most addictive. Options offered include letting you retract your last move, peeking under the remaining tiles (cheat mode), and asking for help (you'll feel ashamed when you do).

The IIGS is well suited for *Shanghai*. Its graphics resolution shows detail in the tiles, making many of them small works of art. Unlike the versions for other machines—notably the Apple IIe, Commodore 64, and Macintosh—the IIGS *Shanghai* is sharp enough that stacked tiles are indicated by realistic shadows. The point-and-click method of control is simple and doesn't get in the way of your thinking when you're staring at the screen.

The IIGS doesn't make *Shanghai* what it is, however. The game carries its own weight, and is nearly as much fun to play on a less-than-attractive screen like that found on the Apple IIe version. *Shanghai* doesn't depend on graphics or sound, but on a strangely fascinating game concept that once tried, calls you back for more. Buy *Shanghai* and you're certain to lose a lot of time in front of your Apple IIGS.



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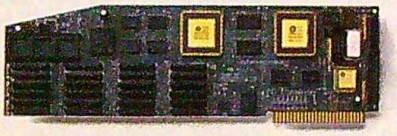

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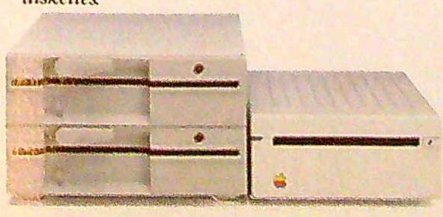
PC Transporter supports up to 5 drives in a number of combinations.

For example, you can connect a 5.25 Applied Engineering 360K dual-drive system directly to the card. Then plug two daisy-chained Apple 3.5 Drives (not the Apple UniDisk 3.5) to the dual-drive system. For a fifth drive, use a ProDOS file as an IBM hard disk.

PC Transporter controls Apple and IBM compatible disk drives. It supports 3.5" and 5.25" MS-DOS and ProDOS formatted diskettes.



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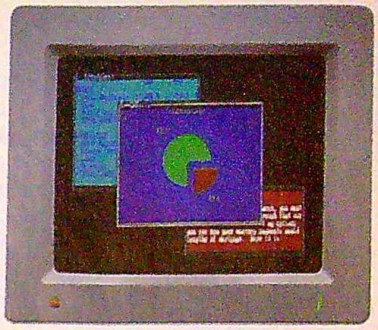

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Hot Tomorrows

The IIGS's future looks bright, both in games and in general. A year ago, with just a small handful of packages available, there wasn't much reason to buy a IIGS. Today, that's different.

With its faster speed, better graphics, and phenominal sound capabilities, the computer is attracting developers. As the months go by, you'll see more and more *new* IIGS games published—new as in not ever done before on another machine (as *Tower of Myraglen*), or at least new as in not ever done before on an Apple (as *Thexder*). Technology has a way of determining game design and that will hold true of the IIGS as well as it has for such computers as the Amiga and the Macintosh. When sound is so powerful, designers are bound to make it a more integral part of the play, for example.

According to some developers, IIGS programs—games included—are getting more attention from publishers. That's not hard to understand. Software publishers are in business to make money, and although the numbers of IIGS computers on people's desks are by no means close to the numbers of older Apples still used, the IIGS *is* the future of Apple II computing. Publishers realize this and are eager to jump into the market as soon as possible. This year will be a big year for IIGS programs, from games to powerful applications.

Further down the line lie some intriguing possibilities. Our "Just for Fun" columnist Dan Gutman uncovers one—compact disc gaming—in this issue in his interview with *Zork* game designer Mark Blank of Infocom. The IIGS is the perfect Apple II platform (really, the only one that makes any sense) for connectivity with compact discs and their huge mountains of storage. Imagine your IIGS hooked up to a disc player, and imagine playing a game that uses video, sound, graphics, and text to create a world so real that you forget it's a game.

Hang on to your Apple IIGS. Its gaming days are just beginning.

On The GS Trail Of A Bard's Tale

The *Bard's Tale* takes full advantage of the Apple IIGS's sophisticated sound and graphics, but the role-playing adventure game didn't spring to life on that system. According to the game's developer, Brian Fargo, president of Interplay Productions, *Bard's Tale* was written first on the Apple II. From there, it was ported to the Commodore and then to the Amiga. These earlier conversions for other machines made it easier for the designers to produce the Apple IIGS verions, Fargo said.

"We were able to take the art work from the Amiga, port it over to the IIGS, and touch it up," he said. "Then we had pretty much state-of-the-art GS graphics. Had we gone from the Apple straight to the GS, we wouldn't have had any graphics to go from, and we would have had to do them all from scratch."

Creating IIGS graphics from scratch is a time-consuming chore for a designer unless he's coming from a 68000 microprocessor chip or unless there is a 68000 version of his program, Fargo said. "Because of the higher graphics of the Amiga and the (Atari) ST, you can port it to the IIGS and give it the quality it needs."

Since much of the code for the *Bard's Tale* was already up and running on the Apple II's 6502 microprocessor, Fargo spent more time refining the program so it could be played using the IIGS's mouse. When the existing code was modified, the designers took the graphics from the Amiga and mixed the two together for the GS version.

Fargo said that producing music to take advantage of the IIGS's Ensoniqs sound chip was a fairly complicated part of the project, but that it was worth it to obtain the quality he wanted the game to have.

"We created the music on a Mirage synthesizer, then we took the MIDI data and we ported it down to the GS. Then we wrote a driver that interpreted that MIDI data. So when you hear a harp or when you hear a flute, you're hearing actual digitized samples of harps and flutes."

Variety and quality are two attributes that Fargo said must be incorporated into the design of any game for it to have a chance at success in today's market. "It's good to have what they call a *deep* game, or something with a lot of variety. That way when you play it, each time you discover something new about it. It keeps you wanting to continue playing.

"And the quality, I think, is so important. It just looks good, and it feels good, and it sounds good. It helps you believe in the whole fiction."

When a game designer wants to relax, what does he boot up on his own computer? "I had a lot of fun with *Dark Castle*," Fargo said, "and *Grid Iron* is a lot of fun on the Amiga."

Fargo doesn't consider himself to be an average consumer because he is so involved with the business of designing computer games. Occasionally he's in the mood for an arcade-style game and some "brainless shooting things up," but role-playing adventure games hold a stronger appeal for him. The problem is finding the time to play them.

"It takes so many hours," Fargo said. "I don't even have time to test my own products. To sit down and play *Ultima* for 100 or 200 hours is really almost prohibitive anymore. But I enjoy them."

—Tom Netsel

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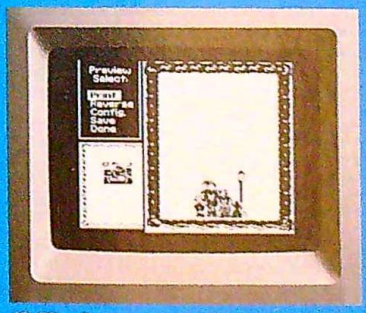

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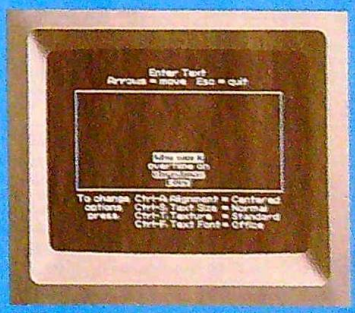

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Buyer's Guide To Apple IIGS Games

Mickey McLean

The following buyer's guide lists 46 Apple IIGS-specific games—all those we could ferret out in December 1987. If under the *Available* column you see *Now*, we've actually booted the game. Other dates were provided by the manufacturer and may have little relation to real release dates. Descriptions of unreleased games were often obtained from publishers' promotional literature.

Game	Price	Publisher	Requirements	Description	Available
The Bard's Tale	$49.95	Electronic Arts	512K	Players control a band of adventurers whose quest it is to defeat Mangar, the controller of Skara Brae. The Bard and his music are your best weapons, if you can keep him out of taverns. Features 16 levels of dungeons and the streets of Skara Brae.	Now
Beyond Zork	$49.95	Infocom		Combines interactive fiction with a character-building role-playing game. This is a new chapter set in the Zorkian universe. Create your own character, and choose different levels of six attributes, your location, and your inventory. You may choose between the onscreen map and window display and the standard text-only screen.	December 1987
Blackjack Academy	$39.95	MicroIllusions		Learn how to play blackjack. Up to five people can play with multiple table rules including Las Vegas, Reno, and Atlantic City rules. Online help is available for all play options.	November 1987
California Games	$39.95	Epyx		Features six of the state's most popular sports. One to eight players can choose to compete in skateboarding, foot bag, surfing, roller skating, bicycle motocross, and flying disc.	Now
Cavern Cobra	$49.95	PBI Software	512K	Fly a Cobra chopper in this action/arcade game. The Cobra carries advanced weaponry, while the cavern is heavily fortified with anti-aircraft guns, magnetic mines, and missiles. Features digitized stereo sounds when used with an MDIdeas' SuperSonic stereo card.	Now
Destroyer	$39.95	Epyx		Players take command of a fully-armed Fletcher Class U.S. destroyer. Players have radar and sonar at their disposal and can control depth charges, anti-aircraft guns, and torpedoes.	January 1988
Dondra	$49.95	Spectrum Holobyte	256K	The first game in the Questmaster series. Players assume the role of Terna, the last of the Tellasien race. In the futuristic world of Dondra, the player must find the Crystal Prism of Heheutotol while encountering mythical characters. The player's character receives experience points based on the attributes of play which can be transported into future Questmaster modules.	Winter 1988
Dream Zone	$49.95	Baudville	512K	A mad scientist's elixir has turned the dream world into reality. Players must escape from this fantasy land by using logic, imagination, persistence, and humor. Hundreds of locales can be found on the two 800K disks. Features include color-coded text and stereo sound.	Now
Dungeon Construction	$39.95	MicroIllusions		The second in the Questmaster series, this construction game was used to create *Land of Legends*. MicroIllusions plans a construction contest.	Winter 1988
Ebonstar	$39.95	MicroIllusions		This futuristic battle game takes place on the battlefield of Ebonstar.	Winter 1988
Faery Tale Adventure	$49.95	MicroIllusions		In this animated adventure, players guide their character through a land of dragons, wizards, and princesses while sharing the quest of three brothers. The game features close to 20,000 screens depicting the kingdom and the surrounding area.	March 1988
Fire Power	$24.95	MicroIllusions		The first in the One-to-One series of games which allows players to compete with each other face-to-face or by using a modem. This game pits opponents in a tank battle. Players can choose different tanks and scenarios.	Winter 1988
Galactic Invasion	$24.95	MicroIllusions		Another One-to-One arcade game. This space battle game requires quick hand and eye coordination. Players can do battle against the computer or against another player—face-to-face or with a modem.	Winter 1988
GBA Championship Basketball	$44.95	Gamestar	512K	Two-on-two team action. Players compete in a 4-division, 24-team league, which leads up to the GBA championship. One or two players can compete against the computer, or two players can battle in two-team games.	Now

Game	Price	Publisher	Requirements	Description	Available
Hacker II: The Doomsday Papers	$39.95	Activision	512K	The sequel to the original Hacker. Players must crack Russian security and save the United States.	Now
Hardball!	$44.95	Accolade	512K	This baseball simulation features a 3-D perspective of each field angle. Two players can go head-to-head, or one can play against the computer.	Now
King's Quest—Quest for the Crown	$49.95	Sierra On-Line	512K	In this animated adventure, players assume the role of Sir Graham, the brave knight. As Sir Graham, players must search the kingdom for the lost treasures of Daventry and return them to King Edward. The game includes multiple solutions and variable scoring, providing new twists on the game each time it is played.	January 1988
King's Quest II—Romancing the Throne	$49.95	Sierra On-Line	512K	In this second of the *King's Quest* series, King Graham, inheritor of the Daventry throne searches for the magic keys that lead to an enchanted land. Players explore underground caverns, towers, and oceans.	March 1988
King's Quest III—To Heir Is Human	$49.95	Sierra On-Line	512K	Players become Gwydion, a young slave, in the third of the *King's Quest* series. Gwydion must use wit to learn magic spells from the evil wizard Manannan, but if the wizard finds out, he will kill him. Sierra's self-mapping system helps players keep track of where they are.	March 1988
Land of Legends	$49.95	Microllusions		Players travel through dungeons while they encounter bandits and monsters. This role-playing adventure puts you in the role of protector of the kingdom. Features a 3-D viewing window, onscreen mapping, and a combat mode.	Winter 1988
The Last Ninja	$39.95	Activision	512K	This action/adventure game features ninja-to-samurai combat; searches for hidden weapons, food, and charms; and ninja magic. In addition to samurai henchmen, players also encounter martial arts masters, dragons, and beasts.	Spring 1988
Leisure Suit Larry in the Land of the Lounge Lizards	$39.95	Sierra On-Line	512K	Players become the loveable nerd Larry as they travel through the town of Lost Wages for one wild night. A contemporary comedy game intended for adults.	Now
Marble Madness	$34.95	Electronic Arts		One or two players can play this arcade-style game that contains six levels of 3-D mazes. Players must also avoid slimes, oozes, hoovers, and steelies along the way.	Now
Mean 18	$44.95	Accolade	512K	One to four players can choose to tee it up at Pebble Beach, St. Andrews, or Augusta National. A golf course architect set allows users to design their own perfect layout. Supplemental course disks available.	Now
Mean 18's Famous Course Disk, Volume II	$19.95	Accolade	Mean 18	Three new courses for *Mean 18*. Includes Turnberry, Scotland; Inverness Club, Ohio; and Harbor Town, South Carolina.	Now
Mean 18's Famous Course Disk, Volume III	$19.95	Accolade	Mean 18	Three more *Mean 18* golf courses: Las Colinas in Texas, The Olympic Club in San Francisco, and Muirfield in Scotland.	Now
Mean 18's Famous Course Disk, Volume IV	$19.95	Accolade	Mean 18	The three courses on this disk are: Castle Pines in Colorado, Doral in Florida, and Kapalua in Hawaii	Now
Mixed-Up Mother Goose	$29.95	Sierra On-Line	512K	In this 3-D animated adventure, children help Mother Goose find her mixed-up rhymes and restore them to normal. The game comes with written and visual clues with pull-down menus for additional assistance. Included in the package is a full color map of Mother Goose Land.	April 1988
Monte Carlo	$39.95	PBI Software	512K	This casino game program lets you play games such as blackjack, roulette, craps, baccarat, poker, and trente-et-quarante.	Now
Police Quest	$49.95	Sierra On-Line	512K	A 3-D animated adventure game that takes players into the world of police and crime. Written by an ex-police officer, this game requires players to follow strict police procedure. An indoctrination manual is included to aid players with procedures for traffic violations, felony arrests, and use of weapons.	April 1988
Roadwar 2000	$44.95	Strategic Simulations	512K	In this futuristic game, the U.S. Government has requested that the patriotic leader of a road gang locate eight scientists in what is now a lawless wasteland. Players must battle mutants, cannibals, and rival road gangs while trying to find the scientists.	Now
Romantic Encounters at the Dome	$39.95	Microllusions		Players find themselves at the Dome, a futuristic single's club complete with parties, people, and dancing. Players are able to play out fantasies and experiment with people. The program contains some explicit adult situations.	Winter 1988
Sea Strike	$39.95	PBI Software	512K	Players pilot an experimental helicopter while the enemy tries to sink a convoy of oil tankers by attacking with aerial and sea mines, patrol boats, ships, missles, and planes.	Now
Shanghai	$44.95	Activision	512K	Based on the ancient Chinese game of Mah-Jongg, 144 tiles must be removed in pairs until all have disappeared or no additional moves can be made. The game includes solitare- and multiple-player options.	Now

Game	Price	Publisher	Requirements	Description	Available
Silent Service	$39.95	Microprose	256K	Become the captain of a WWII American submarine in the South Pacific, experiencing scenarios such as single-ship attack and multi-patrol missions with heavily escorted convoys. Game controls employ onscreen icons for all activity selections, allowing the submarine to be controlled by the mouse.	Now
Space Quest—The Sarian Encounter	$49.95	Sierra On-Line	512K	This is the first in a series of space parody games. Designed to take advantage of IIGS graphics and digitized sound, this game lets players experience digitized explosions, alarms, and other space noises.	Now
Space Quest II—Vohaul's Revenge	$49.95	Sierra On-Line	512K	The sequel to *Space Quest—The Sarien Encounter.* Players rejoin Roger Wilco, a sanitation engineer turned reluctant space hero, as he tries to defeat the evil scientist Sludge Vohaul.	April 1988
Strategic Conquest II	$49.95	PBI Software	512K	This strategy wargame is set in an unknown world. Players control an army, air force, and navy, and must explore continents, develop forces, and do battle with the computer. The game contains 2 billion different world maps and 15 levels of play.	Now
Sub Battle Simulator	$39.95	Epyx		Command a World War II submarine in either the Atlantic or Pacific, complete the assigned mission, survive, and return to base. Players can select from 24 American and 36 German missions, all based on historical data.	January 1988
Tass Times in Tone Town	$34.95	Activision	256K	Set in a place called Tone Town—where the top tune is "Tass," by the Daglets, and the local newspaper's top reporter is a dog—this adventure game asks the player to rescue the vanished Gramps.	Now
Thexder	$34.95	Sierra On-Line	512K	Players pilot a robot-jet transforming vehicle through multiple attack scenarios while battling over 20 different kinds of aliens and avoiding dead ends and booby traps. Voice synthesis and a stereo musical score accompany the action. Supports the SuperSonic stereo card.	Now
Tower of Myraglen	$54.95	PBI Software	512K	This arcade-style adventure fantasy puts you in the role of the Knight of Justice in search of the Medallion of Soul Stealing. Survive the traps and evil that impede the journey through the tower, while figuring out clues and discovering secret passages that lead to the next level. Features digitized stereo sound.	Now
Turbo	$24.95	Microlllusions		A game in the One-to-One series, this auto racing game offers several options of cars and courses. Players must avoid oil slicks, spiked wheels, and the police.	Winter 1988
Winter Games	$39.95	Epyx		Compete in seven sports, including the bobsled run, the ski jumping event, the figure skating competition, and the biathlon. The games open with an official ceremony, complete with national anthems.	Now
World Games	$39.95	Epyx		Players compete around the world in eight international sporting events representing any of 18 countries. Events include cliff diving in Mexico, sumo wrestling in Japan, weightlifting in Russia, and bull-riding in the U.S.	Now
World Tour Golf	$39.95	Electronic Arts		Play the famous links of St. Andrew's, Shinnecock Hills, and Pebble Beach. The game features an animated split screen which shows both the overhead and the golfer's views. A course construction set lets users build their own courses.	Now

Publishers' Addresses

Accolade
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Activision
P.O. Box 7286
Mountain View, CA 94043
(415) 960-0410

Baudville
1001 Medical Park Dr., S. E.
Grand Rapids, MI 49506
(616) 698-0888

Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
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Redwood City, CA 94063
(415) 366-0606

Gamestar/Activision
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Mountain View, CA 94039
(415) 960-0410

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125 CambridgePark Dr.
Cambridge, MA 02140
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Microlllusions
17408 Chatsworth St.
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(818) 360-3715

Microprose
120 Lakefront Dr.
Hunt Valley, MD 21030
(301) 771-1151

PBI Software
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Foster City, CA 94404
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Sierra On-Line
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Coarsegold, CA 93614
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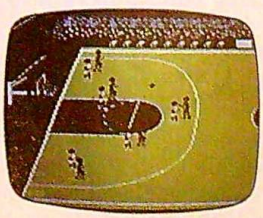

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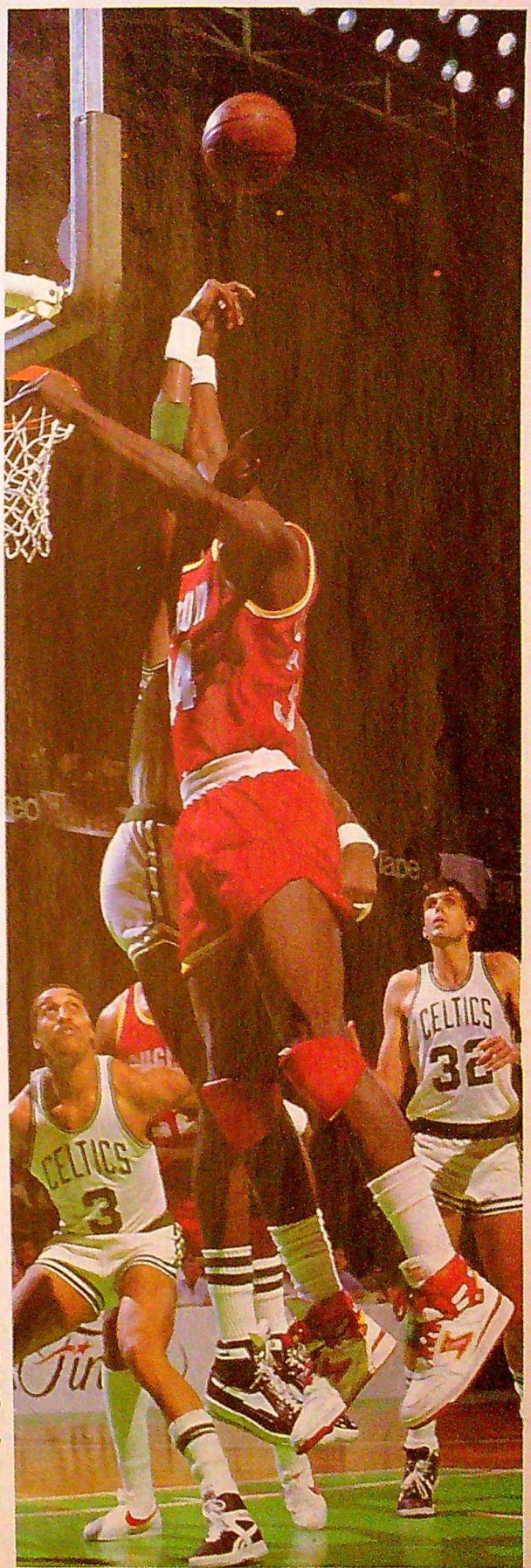


Power Of The Press

Dan Gutman

What's the desktop publishing phenomenon all about? What's all the fuss? Is it really a revolution, or just hype? Gutman looks for some answers—and disappears into the jungle of page layout, laser printers, and the Apple/Mac connection.

One day last year, Susan Ovans got up and walked off her job as a reporter with the *Hull Times*, a small newspaper in Massachusetts. She raised $14,000, bought three Macintosh computers, a laser printer, and started her own newspaper—the *Hull Newsweekly*.

"It's amazing what they can do," says Ovans. "I can't imagine putting out a newspaper the old way. There's no way we could have afforded the initial start-up costs of traditional printing."

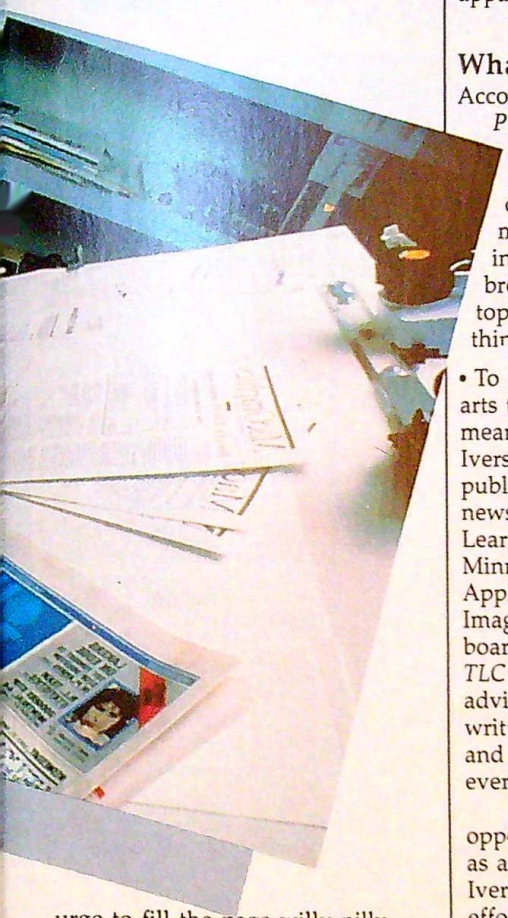
In the offices of the *Hull Newsweekly* they "set type" with the Macs and *MacPublisher III* software. A KoalaPad graphics tablet and a ThunderScan scanner are used for graphics, logos, and ads. Three months after the first issue, the *Hull Newsweekly* had matched the circulation of the 57-year-old *Times*.

Desktop publishing. Everybody's talking about it. Everybody's doing it. But what's it all about? What can you do with it? How much does it cost? Is desktop publishing really a revolution, or is it just hype? We'll try and answer a few of these questions here.

Different (Key)Strokes For Different Folks

What is desktop publishing, anyhow? Word processing, as you probably know, is using a computer to manipulate words and letters to create a well-written document. Desktop publishing, on the other hand, is more involved with the overall layout of the printed page than its content.

The phrase *desktop publishing* is frequently confused with *printing*, which is one of the reasons you frequently see horrible-looking newsletters and brochures produced with a computer and a laser printer. Anyone with a laser printer could call themselves a printer. As soon as people discovered they could mix different typefaces together on a document, there was an almost irresistable



urge to fill the page willy-nilly with every typeface imaginable.

To consider yourself a publisher, not just a printer, you have to be aware of such things as *page layout, design,* and *typography.* Putting together an attractive, organized, and readable page is an art. A publisher doesn't want his or her publication to be mistaken for a ransom note.

At the same time, desktop publishing doesn't (yet) match the quality of "real" publishing. Today's laser printers have a resolution of about 300 dots per inch, while professional typesetting can go as high as 2,450 dots. That difference, though difficult to comprehend in the abstract, is quickly apparent when type is enlarged.

What It Is

According to *The Complete Desktop Publisher* (COMPUTE! Books), desktop publishing means "applying the capabilities of desktop computers to automating any part of the publishing process." That's a pretty broad definition. In reality, desktop publishing means different things to different people.

• To Roger Iverson, a language arts teacher, desktop publishing means a way to teach kids. Iverson and 25 of his students publish *TLC Today,* the school newspaper of the Technology Learning Campus in Robbinsdale, Minnesota. They use several Apple IIc computers, an ImageWriter printer and Springboard's *The Newsroom* software. *TLC Today* is 6–8 pages of gossip, advice, cartoons, and school news written entirely by sixth, seventh, and eighth graders. It comes out every three weeks.

"It's been a wonderful opportunity to use the computer as a language arts tool," says Iverson. "It doesn't take too much effort to motivate the kids. They really care about their writing. It's kind of nice to stand back and watch the kids do their jobs."

• To Jane Zinke, desktop publishing means a free meal. Zinke, 50, prints up menus for Love's Barbeque Pit, the San Diego restaurant where her son works. Using a Macintosh and Mindscape's *GraphicWorks,* she prints each week's Special of the Day and takes it to a local copy shop to be made into an acetate transparency.

"I can do it on short order," Zinke says. "Just a phone call and I'd whip it out."

Until recently, payment consisted of dinner for two on the house. This worked out fine for everybody, but Jane Zinke isn't sure she's going to continue publishing the menus. She recently became a vegetarian, and there isn't much she can eat anymore at Love's Barbeque Pit.

• To Lawrence Kramer of New York City, desktop publishing means a way to "work for people I believe in and make more money than I ever made before in my life." Kramer works in his Upper West Side apartment with two Macintosh computers, two phone lines, an Apple LaserWriter, and a copying machine. He's one of the first people to make his living as a full-time desktop publisher.

Kramer contracts to publish newsletters for organizations like the National Composer's Guild, Educators for Social Responsibility, Democratic Socialists, Friends and Relatives of the Institutionalized Aged, the National Writer's Union—20 groups altogether. Frequently, Kramer does everything from writing the copy to delivering the finished newsletters.

• To students at the Thurston Middle School in Laguna Beach, California, desktop publishing means a way to get into the *Guinness Book of World Records.* Last year, to publicize a partnership with a local bank that helped students get jobs, they created what is believed to be the longest banner in the world—1.7 miles long!

The banner was made on four Macintosh Plus computers with Brøderbund's *Print Shop.* It took 420 students two weeks—and lots of printer ribbons—to complete the banner.

Obviously, desktop publishing means many different things. If you make greeting cards for Grandma on your Apple IIc and a dot-matrix printer, you're a desktop publisher. And if you print

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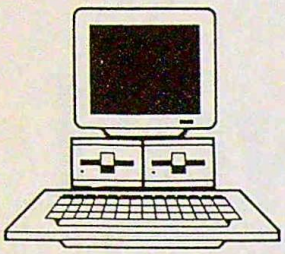

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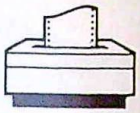

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Old News

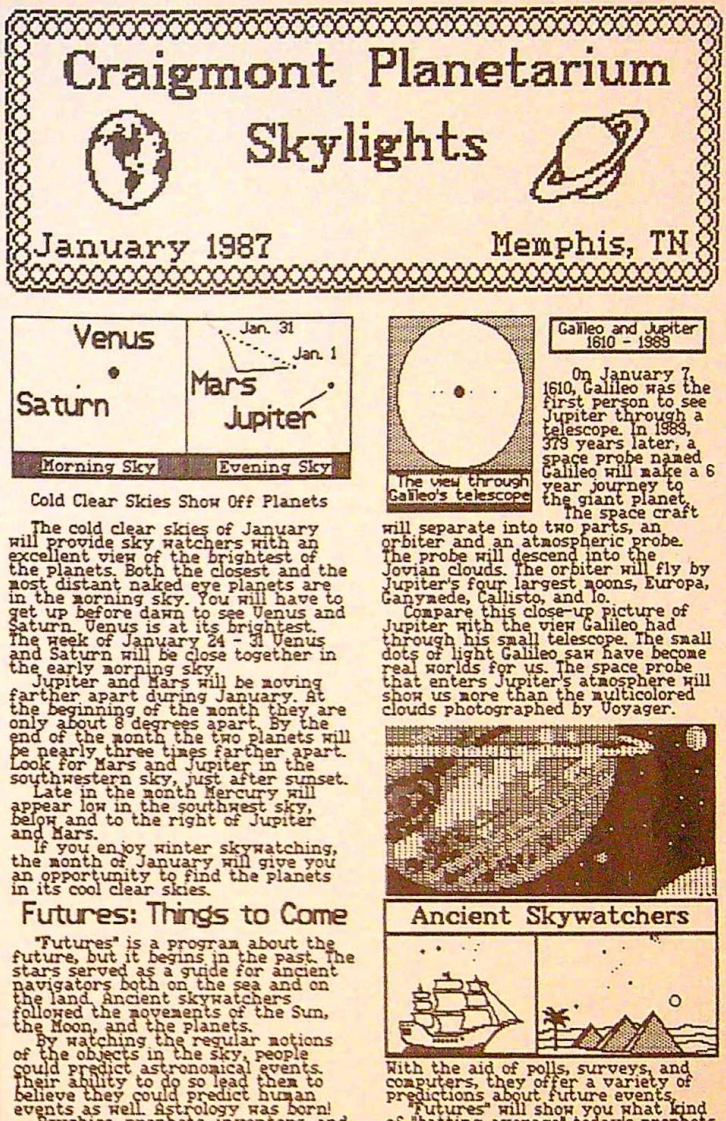
Only lately has the Apple II been "discovered" as an effective desktop publishing machine. Part of this revelation came with the introduction of the Apple IIGS. Its Macintosh-like look has made people think it is destined for similar applications. John Sculley, Apple Chairman, has made a point of telling Apple II developers to emulate the Macintosh's successes—desktop publishing one in particular. But the slowly growing group of desktop publishing programs isn't restricted to the IIGS only. Of the four programs announced by the end of 1987, three will work on any Apple II computer with at least 128K of memory.

All this talk about the Apple II and desktop publishing doesn't come as news to nearly a third of a million people who have been using *Newsroom*, the original desktop publishing program for the Apple II. Though considered primitive by today's standards, *Newsroom* was in a category by itself long after its 1985 release. It still continues to sell well, even though its publisher, Springboard Software, announced its new *Springboard Publisher* months ago.

Newsroom found a home first in the classroom, where it was used to create small newspapers in elementary and junior high schools. Then it found its way into homes and even some businesses. The program is, in many ways, simple to use. Six modules segregate the creation of text, graphics, and the paper's banner; putting those elements together in a layout; printing; and using a modem to tranfer stories or complete issues from one computer to another. You move from module to module, working your way through the process of creating a newspaper or newsletter. The program is easy enough to operate that children can, and frequently do, use it without constant adult supervision.

Using *Newsroom* can also be a frustrating experience, especially if you've worked with more up-to-date desktop publishing software. There is no what-you-see-is-what-you-get feel to the program. In fact, there's not even a preview feature to let you see a page before it's printed. Its text editing abilities are clumsy at best, its graphics uneven, and its layout options quite restrictive. There are ways around the program's rough spots—the book *Using Newsroom at Home, School, and Work* (COMPUTE! Books) goes into some depth on this subject.

Yet the program has enjoyed immense success. Why?



One reason is because until lately, it was the only game in town for the Apple II (also true of its Commodore 64 version). Another reason is its well-deserved ease-of-use. It's hard to imagine fifth graders sitting down and using some of the desktop publishing programs now hitting the market. Its price—discounted to less than $40—helped its popularity. But perhaps the most telling reason is that it makes it fun to write, edit, layout, and print your own newspaper. That's something every desktop publishing program should wish for.

—Gregg Keizer

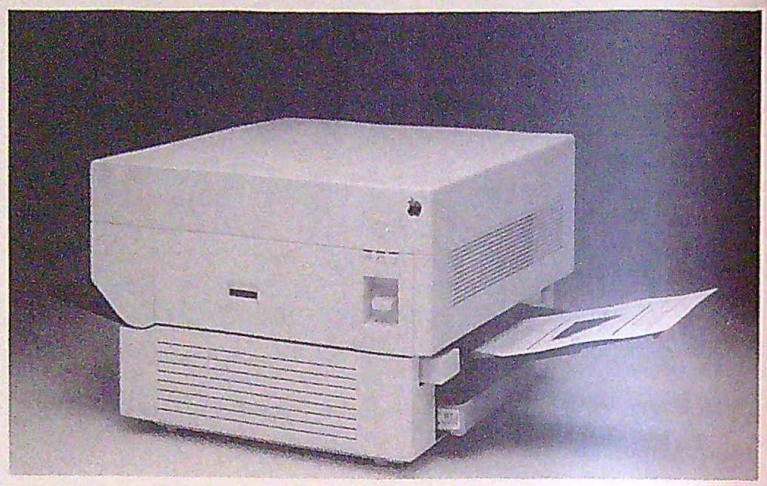
thick technical reports for your Fortune 500 company, you're a desktop publisher, too. So is anyone who falls in the middle.

What Can *You* Do With It?

In the last year, people have come to realize anything that can be printed can be printed with the help of a computer: newsletters, brochures, press releases, presentations, progress reports, in-house magazines, flyers, ads, and so on. Newspapers like the *New York Times* and *USA Today* now produce graphics onscreen. *Publish!* magazine, dedicated entirely to the topic of desktop publishing, is written, edited, and produced entirely on computer.

You can even desktop publish a book. Last year, Joe Namath and Bob Oates, Jr., bypassed professional typesetting to write and print the 260-page *Football for Young Players and Parents* entirely on a computer. Writer Donald Beil did the same thing using *Pagemaker* (Aldus) to produce a book on the Lotus program *Jazz*. Beil completed the book four months ahead of schedule, and it became one of the first *Jazz* guides to hit the market.

Home computing, which many critics have been writing off for years, has turned into a desktop publishing gold mine. Brøderbund's *Print Shop* has become one of the biggest selling software packages in history (over 800,000 copies), and it has been followed by other innovative printing programs like *The Newsroom* (Springboard), *Certificate Maker* (Springboard), *ComicWorks* (Mindscape), *T-Shirt Shop* (Spinnaker), *Create a Calendar* (Epyx), *Walt Disney Card & Party Shop* (Bantam) and *Bumper Sticker Maker* (IntraCorp). Like photography fifty years ago, printing is becoming a household hobby.



Apple's LaserWriter is one of the main reasons why desktop publishing has become so popular. In January, Apple announced three new laser printers—the LaserWriter II series—which offer more features for less money.

Why Do The Dirty Work?

Even if desktop publishing is the best thing since papyrus, why should you bother with do-it-yourself drudgery when you can hire somebody else to get the ink on their fingers?

• **Money.** Desktop publishing costs pennies. A professional typesetter

Desktop Dictionary

A New Batch Of Buzzwords

I need some dingbats to bleed flush into the gutter on this mechanical! And I need them now!

Did that make any sense to you?

Desktop publishing has become the undisputable buzzterm of the last year. Suddenly, otherwise normal people are walking around tossing out words like *kerning, flush left,* and *fonts,* terms previously the domain of people in the printing and publishing business.

Desktop publishing has spawned a new generation of computer buzzwords. If you're planning to publish a newsletter, greeting card, or brochure on your computer, you'll want to know the lingo. Here's just a taste of your new dialect.

Ascender. The part of a letter that extends higher than the body of the letter. The letters b, h, and d have ascenders. A *descender* goes below the line, as in the letters g, j, and y.

Bleed. A photo or image that extends all the way to the end of a page, leaving no margin.

Camera-ready. Pages or parts of pages that are ready to be photographed and printed.

Caps. Capital letters. Also called *uppercase.*

Characters. Letters, numbers, symbols, punctuation, and spaces. There are 30 in this sentence.

Clip art. Drawings that are clipped from books and used for quick illustrations in ads and articles. Also used to describe electronic art on disk that can be "clipped" and inserted into a document on the computer.

Copy. Text. The written word. This article consists primarily of *copy.*

Cut and paste. To take material away from one part of a document and put it into another. This used to be done with razor blades and rubber cement. Now it can be done entirely on a computer screen.

Dingbats. Ornamental and fancy characters used for embellishment.

DPI. Dots per inch. A measure of printed resolution, just like *pixels* are a measure of screen resolution. A newspaper has between 600 and 1200 dpi, while a slick publication like *National Geographic* has as many as 2,450.

Dummy. A rough draft of a page layout.

will charge as much as $100 to set a single page of text. Tom Hamilton of Sacramento prepares *Balloon Life* magazine on a Macintosh and LaserWriter for 60 cents a page. Susan Ovans says the cost of printing the *Hull Newsweekly* is less than a third of what she'd pay for a typesetting setup.

For simple greeting cards and banners you make at home, the cost is negligible. If you're in business, desktop publishing systems have been known to pay for themselves in a few months.

• **Time.** If you send your work out to a professional typesetter, don't expect to see it back for at least a day. Printing companies take much longer. The process of publishing is slow. This issue of COMPUTE!'s Apple Applications had to be put together back in December and early January in order for it to get to you in late February. By publishing on computer, however, you can see the results right away, then send the finished product thousands of miles with a modem—instantaneous delivery.

• **Control.** When almost anyone can own the equivalent of a printing press—computer, printer, and software—the person who clicks on the Print menu is in complete control of the finished product.

If you hire someone to do a brochure for you, you're letting that person make decisions for you. You may not even be aware of those decisions until you see the printed brochure. But when you publish it on your own computer, you know exactly what you're getting—you can see it right on the screen.

WYSIWYG, they call it—*What You See Is What You Get.* And if you don't like what you got, click that mouse and change it. It's easy to make revisions and updates right up to the moment the brochure is printed.

• **Quality.** Good desktop published material makes typewritten pages look like chicken scratching. Even if it's not quite as crisp as real typesetting, your documents will look more authoritative, more professional, and will attract more attention than ever before. It's amazingly easy to print materials that look like they came out of a Fortune 500 art department.

• **Fun.** Oh sure, you can pay somebody to print your newsletter for you. You can probably pay somebody to print out the longest banner in the world for you. Nobody needs to buy *Create a Calendar* for $29.95 when you can get a professionally-printed calendar at your local gas station for free.

But what fun is that? Part of the kick of desktop publishing is that you get to make it yourself. It's not going to look quite as slick as what you could buy in a store, but you created something from scratch with your own hands on your own computer. There's something intensely satisfying about that, whether you're six years old or sixty.

Unlike many other computer applications, desktop publishing makes intuitive sense. How many people—non-computer users now—know what database management or telecommunications or spreadsheets are? To tens of millions of people, these are still only vague concepts. But desktop publishing, now that's something anyone can understand—it's a newspaper, a magazine, a greeting card, a postcard, a sign; all made on your desktop.

OK, Now The Bad News

Let's get down to specifics. What do you have to buy to do all this great stuff, and how much is it going to cost you? A complete publishing system can range from a few hundred dollars for a simple setup at home all the way up to a

Flush. When a block of text is lined up along a margin. If the copy lines up at the left margin, it's *flush left.* If it lines up at the right margin, it's *flush right.* If it lines up on both margins, it's *justified.*

Font. The entire alphabet in a particular typeface and size. *Helvetica* is a popular typeface. Ten-point Helvetica is a font.

Footer. Words that appear on the bottom of each page, like the date or page number. If it's at the top of the page, it's the *header.*

Gutter. The area where the left and right pages of a magazine or book are joined. If you put copy too close to the gutter, it may disappear into the binding.

Halftone. A black-and-white photograph composed of tiny dots, like those in newspapers.

H & J. Hyphenation and justification.

Kerning. A method of moving adjoining letters closer together to make them look better. The letters *Ta* look better if the *a* is tucked in slightly under the top of the *T.*

Leading. Pronounced *ledding.* The amount of space between lines of type.

Mechanical. A page layout that has been pasted up and is ready to be printed. Also called a *paste-up.*

Point. A unit of measure indicating how tall letters are. Most newspaper type is 10 point. The headlines are much larger—48 point or larger.

Sans serif. Type styles that do not contain sharp points and flourishes at the end of each stroke. Also called *grotesque type.*

Tombstone. When two unrelated articles line up next to one another on a page. This is considered to be unattractive, and most art directors prefer to balance the articles around the page.

U & LC. Upper- and lowercase. Capitals and small letters.

Widow. A single word or syllable that ends a paragraph on a line all by itself. As an example, the next line looks stu-
pid.
Magazine editors love to "kill the widows."

WYSIWYG. "What you see is what you get." Desktop publishers can preview on the screen exactly what the finished page will look like. Pronounced *wizzy wig.*

—Dan Gutman

With Power, There Comes A Price

AST-VisionPlus
AST Research
2121 Alton Ave.
Irvine, CA 92714
$295

Apple LaserWriter
Apple Computer
20525 Mariani Ave.
Cupertino, CA 95014
$4999

Apple Writer/LaserWriter Utilities
Synergetics
Box 809
Thatcher, AZ 85552
$50

DeluxePaint II
Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
$100

Fullpaint
Ann Arbor Softworks
2393 Teller Rd.
Newbury Park, CA 91320
$99

MacVision
Koala
269 Mt. Hermon Rd.
Scotts Valley, CA 95066
$350

MacWrite
Claris
440 Clyde Ave.
Mountain View, CA 94043
$125

Microsoft Word 3.01
16011 N.E. 36th Way
Box 97017
Redmond, WA 98073
$395

Microtek's MSF-300C
Microtek
16901 S. Western Ave.
Gardena, CA 90247
$1,895

Newsroom
Springboard Software
7808 Creekridge Circle
Minneapolis, MN 55435
$60

PageMaker
Aldus
411 First Ave. South
Seattle, WA 98104
$495

Personal Laser Printer
General Computer
215 First St.
Cambridge, MA 02142
$1,999

Print Shop
Brøderbund
17 Paul Dr.
San Rafael, CA 94903
$60 (Apple IIGS)

Radius Full Page Display
Two Page Display
Radius
404 East Plumeria Dr.
San Jose, CA 95134
$1,595–$1,995 (Full Page)
$2,395 (Two Page)

ReadySetGo 4.0
Letraset
40 Eisenhower Dr.
Paramus, NJ 07652
$395

Red Ryder
Freesoft
150 Hickory Dr.
Beaver Falls, PA 15010
$80

Springboard Publisher
Springboard Software
7808 Creekridge Circle
Minneapolis, MN 55435
$140

Superpaint
Silicon Beach
9580 Black Mountain Rd.
P.O. Box 261430
San Diego, CA 92126
$150

ThunderScan
Thunderware
21 Orinda Way
Orinda, CA 94563
$220 (Apple II); $250 (Macintosh)

professional $50,000 office system.

The requirements for a Macintosh system have been well-publicized. You need a Macintosh obviously, and the Macintosh Plus or SE should be able to handle virtually any publishing job. A standard word processor such as *MacWrite* or *Microsoft Word* 3.01 can be used to create the text for your publication. *ReadySetGo* and *PageMaker* are the most popular software packages to do real page composition onscreen. An assortment of clip art programs and a good graphics program such as *Fullpaint* or *Superpaint* will make it easy to spice up your publications with good-looking images. The new full-page monitors like the Radius Full Page Display or Two Page Display will make it easier to work on your documents onscreen, and a hard disk drive will make everything easier, but neither of these expensive peripherals is absolutely necessary.

To put photographs into your publication, you'll have to spend more money and buy a scanning device. The popular ThunderScan is the cheapest way to go—it essentially turns Apple's ImageWriter printer into a scanner. Other options would be to hook up a video camera to your computer with a digitizer such as MacVision or a flatbed scanner such as Microtek's MSF-300C.

If desktop publishing is going to be the your number-one computer application, you'll probably need the quality of a laser printer such as Apple's own LaserWriter or General Computer's less expensive Personal LaserPrinter. If you're just a casual publisher, there are businesses popping up all over that will laser print your documents from your floppies for about $1 per page. Laser printer prices continue to fall (the Personal Laser Printer was just recently reduced by $600, for instance), and in time they'll be in reach of even the most occasional publisher.

Finally, if you plan on transmitting your publication over phone lines, you'll need a good modem (I use Apple's) and a communications program such as *Red Ryder*.

When most people think of desktop publishing, the first thing that comes to mind is the Macintosh. But the Apple II family has powerful publishing capabilities at a price much lower than the Macintosh. There are several Mac-like page layout programs for the Apple II, and if I had to pick one I'd pick *Springboard Publisher*. For a paint program, try *DeluxePaint II* on the IIGS.

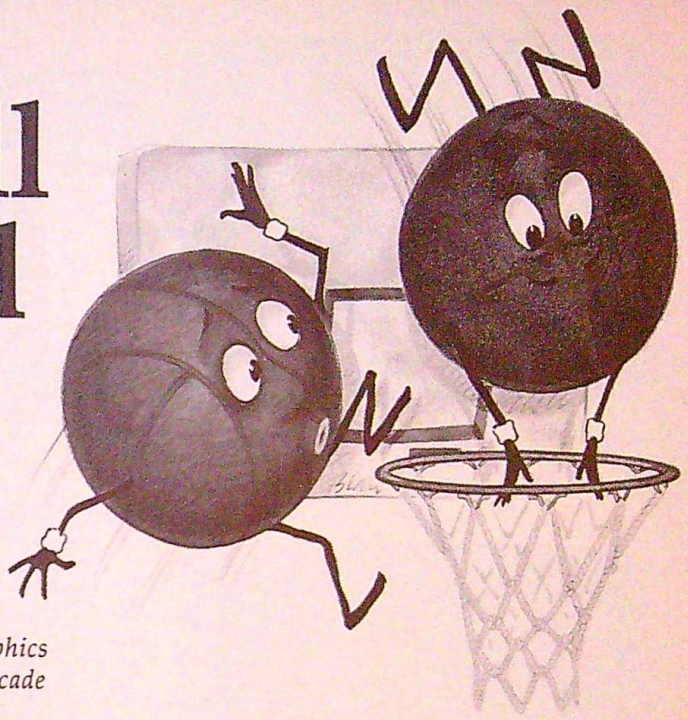
To get those photos into your publications, there's VisionPlus by AST Research, which will transfer black-and-white or color images from a video camera into your IIGS. And Thunderware has a version of ThunderScan that works with the Apple II.

You can even do laser printing with your Apple II. The Apple LaserWriter printer, normally associated as strictly a Mac peripheral, can also be hooked up with an Apple II with *Apple Writer/LaserWriter Utilities*.

The advent of desktop publishing has been compared to the invention of paper or the printing press, and has been hailed as one of the most significant developments in the history of communications. It will take a few hundred years to know if it deserves such acclaim. But in the meantime, we can sure put together some sharp looking pages!

Dan Gutman is the author of I Didn't Know You Could Do THAT With a Computer! *(Compute Books).* aa

Basketball Sam & Ed



Rhett Anderson and David Hensley, Jr.
Apple version by Tim Victor

What better way to score a goal than to go through the hoop yourself? This delightfully clever arcade-style two-player game for all Apple II-series computers is guaranteed to provide hours of entertainment for young or old. Excellent playability and outstanding graphics make "Basketball Sam & Ed" our best Apple arcade game ever. This is a must *for any game lover. Works with both ProDOS and DOS 3.3, and requires 64K RAM and game paddles.*

Run down the court, then bounce, bounce, bounce your way into the basket. Bounce off your opponent, rebound off the wall, and maybe, just maybe, you'll fall through the basket.

Pretty strange basketball. Strange, but enough fun to last a lifetime.

That's the world of "Basketball Sam & Ed," a whimsical version of one-on-one basketball that can be enjoyed by the whole family, young and old. Sam and Ed are miniature basketballs with arms and legs. And as in normal basketball, players score by putting the ball through the net. What's different in this game is that the ball is one of the players.

Obviously, Basketball Sam & Ed isn't an ordinary game of basketball. The three baskets are so high that you need to bounce on or off your opponent to score a goal. As you try to launch off of your opponent, your opponent is trying to do the same to you. It doesn't take long for Basketball Sam & Ed to become a crazy free-for-all, with you and your opponent careening off the rims, backboards, walls, floor, and ceiling.

The Long Bounce

Basketball Sam & Ed is written entirely in machine language, so you'll need to use "Apple MLX," the machine language entry program found elsewhere in this issue to enter it. You don't have to know anything about machine language or machine language programming to type in the game. All you need is a copy of Apple MLX on disk.

Run MLX and when it asks for the starting and ending addresses, type in:

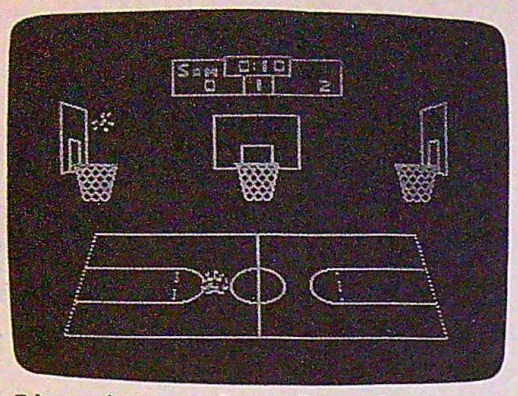
```
STARTING ADDRESS?  4000
ENDING ADDRESS?    5977
```

When the options menu appears, choose E to type in the program; then enter the address where you'd like to start. (If you're just beginning to enter Basketball Sam & Ed, type **4000**, the first address in the listing.) Although a compression algorithm was used to shrink the size of the code, Basketball Sam & Ed is still one of the the longest programs ever published in Apple Applications. After you've finished typing in the data, be sure to save a copy to disk with the filename *SAMANDED*.

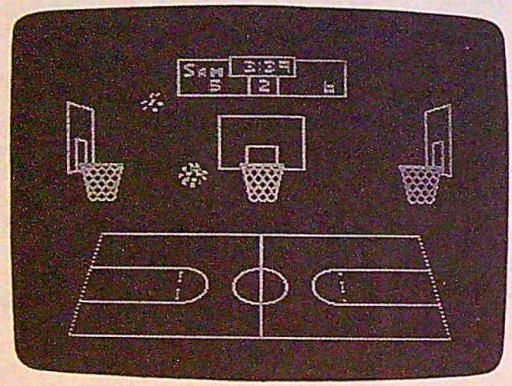
If you want to save yourself the time it takes to type in Basketball Sam & Ed, you can buy this issue's companion disk for $12.95 (see page 45 for information about this issue's disk and ordering details). The disk includes all the programs in this issue, ready to run from a menu.

Tip-Off

Plug in a pair of paddles before turning on your computer. If you're going to play Basketball Sam & Ed on an Apple IIGS, make sure that the computer's speed is set to Normal. Press Open Apple–Control-Reset; select *Control Panel* and then *System Speed*. Press the right- or left-arrow key if *Fast* appears so that System Speed reads *Normal*. Return to the] prompt by pressing Return and selecting Quit twice in a row.



Ed goes for two as Sam sadly watches, unable to prevent him from scoring.



Keeping your player in the air is a key strategy in this high-bouncing computerized game of basketball.

Next, put the disk that contains Basketball Sam & Ed in the drive. To run the game, type

BRUN SAMANDED (or use the filename you specified if it's different)

As an alternative, to start the game, ProDOS users can simply type

-SAMANDED

When the title screen appears on the computer, select the game length you want to play. There are seven games to choose from, though these games differ only in length.

1. **2-Minute Quarters**
2. **4-Minute Quarters**
3. **6-Minute Quarters**
4. **12-Minute Quarters**
5. **5-Minute Halves**
6. **10-Minute Halves**
7. **15-Minute Halves**

Note that the first four games consist of four quarters, while the last three consist of two halves. Basketball Sam & Ed runs in realtime, so a game of 12-minute quarters would take 48 minutes.

After you've made your selection, the game screen appears and the game begins. At the top of the screen is a scoreboard which shows Sam's score, Ed's score, the period number, and the amount of time left in that period.

Sam and Ed, true to their dedication to the sport, are basketballs with a twist: They have arms, legs, and faces. Sam is the orange ball, and Ed is the blue one. If you forget who's who, take a quick look at the scoreboard; the players' names are color-coded.

Run, Bounce, Run

The paddle controls are easy to learn. Your player runs either left or right when you move the paddle in the corresponding direction. The further you twist the paddle, the faster you run. To stand still, center the paddle control by aligning it with the small centering mark which most Apple paddles have. If your paddles lack the centering marks, you may want to make them with permanent markers or paint.

To jump, press the paddle's fire button. You can jump to the left, the right, or straight up into the air, depending on the position of the paddle when you press the fire button.

As in real basketball, the only way to score is by putting the ball through the hoop. In Basketball Sam & Ed, you can score at any of the three baskets. Since you can't jump high enough to score, you'll have to bounce off your opponent. It's not uncommon to bounce off your opponent, the floor, and a backboard before scoring. Any way that you can make it into the basket counts.

Each goal is worth two points (there are no free throws in Basketball Sam & Ed). However, if you leap and bounce off your opponent from the opposite court—in other words from across the center line—and score without bouncing on the floor or on your opponent, you'll score a three-point play.

Once you're airborne, you have no control over your path, so you'll have to time your jump just right to score. If you miss with your jump, your opponent may be able to take advantage of your helpless bouncing to score.

At the end of each period—when the timer reaches 00:00—both players lose control of Sam and Ed. If either Sam or Ed scores before he stops bouncing, however, the basket counts. When the game ends, you are returned to the option screen.

Press the space bar at any time to pause the game. If you wish to restart the game, reset the computer (press Control-Reset) and BRUN the game again.

Strategy (Or Is There One?)

Basketball Sam & Ed looks and plays like an arcade-action game, but after playing a few games, you'll develop some strategies. Most

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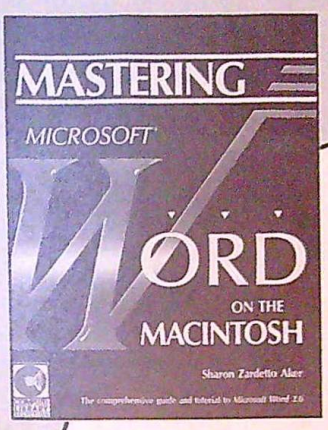

Mastering *Microsoft Word* on the Macintosh
Sharon Zardetto Aker
ISBN 0-87455-118-8 $18.95

Written for both the beginner and the power user, this alternative to the program manual teaches the basics and serves as a complete guide to all the advanced features of the most powerful Macintosh word processor available. Learn the "short menus" mode of *Word* through a no-frills approach to such basics as entering and editing text, character formats, and simple file management. When you're ready, move beyond the basics to tackle more advanced features like frames and borders, footnotes, spacing and kerning, and sorting.
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players eventually come up with their own "plays"—ways of timing their jumps so that they score or keep their opponent from scoring. If your first games seem random, don't worry. Just enjoy the bounces. Before you know it, you'll be making exciting three-pointers at the buzzer.

Basketball Sam & Ed

For mistake-proof program entry, use "Apple MLX" to type in this program.

```
4000: A9 3B 85 EE A9 41 85 EF 11
4008: A9 01 85 EC A9 08 85 ED 83
4010: A9 00 85 CF 20 37 40 20 91
4018: 42 40 A5 1F C9 01 D0 08 6C
4020: A5 1E F0 F0 C9 01 F0 0C 68
4028: 20 71 40 20 A1 40 20 DC 4A
4030: 40 4C 17 40 4C 01 08 A9 EA
4038: 01 85 1C 85 1D A9 09 85 9D
4040: FA 60 A9 00 85 1E 85 1F 5A
4048: A4 FA A5 CF D0 10 A2 00 97
4050: A1 EE 85 CE E6 EE D0 02 91
4058: E6 EF A9 08 85 CF 46 CE C4
4060: 08 C6 CF 88 D0 E4 A4 FA 77
4068: 28 26 1E 26 1F 88 D0 F8 62
4070: 60 A9 01 C5 1C D0 04 C5 F9
4078: 1D F0 25 A6 1C A5 1D 20 A4
4080: 1C 41 86 FE 85 FF A6 1E B7
4088: 86 1A A5 1F F0 0C 20 1C 8D
4090: 41 86 1A 85 1B 20 0F 41 A7
4098: D0 FB A5 1A A0 00 91 FE FD
40A0: 60 A0 FF 84 FB A6 1E 86 FE
40A8: 1A A5 1F F0 17 20 1C 41 45
40B0: 86 1A 85 1B A2 00 A1 1A CF
40B8: A4 FB 99 00 02 C6 FB 20 01
40C0: 0F 41 D0 F0 A5 1A A4 FB 1D
40C8: 99 00 02 A2 00 B9 00 02 69
40D0: 81 EC E6 EC D0 02 E6 ED 43
40D8: C8 D0 F2 60 E6 1C D0 0F AE
40E0: E6 1D A5 1D C9 10 F0 24 37
40E8: 4A 90 FD D0 02 E6 FA A6 C7
40F0: 1C A5 1D 20 1C 41 86 1A 9B
40F8: 85 1B A6 1E A5 1F F0 03 48
4100: 20 1C 41 A0 02 91 1A 88 DE
4108: 8A 91 1A 60 4C 37 40 A0 DD
4110: 01 B1 1A AA C8 B1 1A 86 35
4118: 1A 85 1B 60 86 FC 85 FD A3
4120: 48 8A 06 FC 26 FD 18 65 B8
4128: FC 85 FC 68 65 FD 85 FD DC
4130: 18 A9 FA 65 FC AA A9 5C 21
4138: 65 FD 60 20 C2 25 10 F5 BB
4140: 40 53 AA 3C 85 D8 A5 1A C5
4148: 53 A8 1D 08 20 10 40 8C 11
4150: 78 90 0A 44 21 73 20 1E ED
4158: 65 00 C1 26 43 2B 2A C0 04
4160: 5A 45 01 06 51 43 B2 41 20
4168: D0 06 30 71 95 00 47 BA E7
4170: 58 90 D6 25 3B 00 EB 5C 7E
4178: 23 18 60 52 01 2A C4 C1 BF
4180: 22 46 10 F6 E6 A5 02 02 EA
4188: 54 68 AA 00 8D E6 80 69 17
4190: 04 40 E4 15 91 52 44 42 B3
4198: 11 19 52 D4 86 54 00 3A 41
41A0: 5D 01 A3 0C 82 3E 10 84 F8
41A8: 28 80 52 40 68 5C 2E 64 23
41B0: 09 40 C4 B9 40 6A 1C 22 02
41B8: 08 43 01 34 F2 C0 F4 03 FA
41C0: 18 51 05 3A 61 E8 FA 15 A1
41C8: 69 A3 17 78 03 64 ED A4 7D
41D0: 00 4C 27 04 87 05 1C 36 4A
41D8: A0 13 52 27 02 3A 09 74 AC
41E0: 02 D1 B7 5C 2A 03 4D 75 03
41E8: 0A 68 44 41 E7 A0 46 01 76
41F0: 74 FA 6B 54 41 E7 DC 13 95
41F8: 4C 51 30 4D C1 34 06 D3 8F
4200: 16 4C 57 30 55 01 C6 55 22
4208: CE 5E D3 12 24 53 00 E9 7F
4210: 01 92 BF B1 41 01 58 7B 07
4218: 01 CD 4B 05 8D 58 80 01 1A
4220: 15 A0 78 2A 1D 8D 5C 80 61
4228: 69 F5 1A DE 82 56 86 1B A5
4230: 2C 00 A3 92 C9 23 B5 D5 84
4238: 22 80 08 23 01 C4 02 0D 4D
4240: AD 9C 26 03 05 CD 00 0B 22
4248: 08 25 81 68 00 31 80 02 98
4250: 08 7C 13 40 B0 70 D0 2A 71
4258: 0C B0 46 48 A0 4E 0C 00 B2
4260: 4B 00 03 84 0C 2E 10 05 71
4268: 00 47 4C 38 10 19 0B 5C 23
4270: 71 10 04 0F 34 90 10 0C 33
4278: 56 AC 3B 80 30 01 77 EA 22
4280: 44 04 30 78 31 0C 1E 06 B1
4288: 10 81 67 00 10 2A 61 00 4E
4290: 84 4D 14 60 A2 8F 04 7A 09
4298: 11 10 06 03 40 98 C0 45 C5
42A0: 18 41 50 83 81 54 14 00 49
42A8: 01 15 7E DC 71 F0 42 70 D4
42B0: 04 80 E6 16 26 00 50 AB 13
42B8: 97 04 6E A3 2E B0 6E B4 D7
42C0: 49 00 92 95 3E 40 C0 9D A7
42C8: C0 5A 09 0C 94 03 8A 63 4F
42D0: 62 18 04 E0 2B 09 0B 7E 2D
42D8: 40 12 89 24 26 54 22 2B 67
42E0: AB 1F F9 81 0B 1F 30 FE 8E
42E8: 01 60 CE 7F E4 0C A0 4E BE
42F0: 00 04 20 C0 00 06 0A 50 03
42F8: E0 01 02 02 25 40 00 42 FA
4300: 41 20 33 95 48 40 68 A7 AA
4308: 1F 50 9C 49 85 04 10 BE 75
4310: D0 00 14 73 1E 8D 74 D2 9B
4318: 7B 2C 95 14 94 0A 52 29 F5
4320: E1 52 50 56 F0 14 D4 05 22
4328: 52 31 81 09 49 2F EC A5 6B
4330: B2 13 BD A9 8C 17 00 C0 A8
4338: E8 05 C4 42 C6 49 26 14 EC
4340: 58 1C 48 06 0C 58 D2 00 CA
4348: 06 01 48 CA 48 E3 13 51 11
4350: FE 81 06 01 60 04 81 65 03
4358: 8B 34 F0 02 40 01 05 0C 0C
4360: 19 C7 84 71 2E C4 A0 8F 62
4368: C5 3A 59 AC 94 71 FA 88 3F
4370: B5 93 58 31 E9 26 56 78 E1
4378: 70 E8 25 31 12 C6 81 61 39
4380: 82 64 20 80 07 81 64 24 98
4388: 80 87 80 54 20 80 A6 83 5A
4390: 24 FE C1 20 8D 11 A0 89 9E
4398: 20 19 06 DE 4D C6 81 79 26
43A0: 53 61 00 1A 05 F2 DD 77 F1
43A8: 03 5E 2A 3B 16 31 C9 28 72
43B0: 03 E3 34 78 E6 71 B5 3B 63
43B8: AC 30 90 F8 5C 30 AE F5 3A
43C0: 0C 60 68 04 C8 2A 19 7F 53
43C8: 42 EE 11 62 0C 7A 59 AC 1E
43D0: 0F 07 14 93 35 D6 3E 18 F5
43D8: 38 2C 56 94 20 A1 57 10 E0
43E0: F7 92 41 00 96 4E 11 00 40
```

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43E8: 57 56 99 79 69 19 84 24 58
43F0: 34 E8 44 66 4C 3A 69 39 12
43F8: E5 C6 FA 90 80 31 59 23 2B
4400: EB 03 82 C3 22 4B 26 12 68
4408: 48 B0 E8 E5 5B 0B 74 0A 56
4410: A0 30 59 A9 E6 E5 69 A2 FE
4418: 8D A6 3A E9 A7 EB E5 45 F4
4420: 66 18 0A F0 46 E6 54 E0 89
4428: B9 B6 65 A5 C1 A0 D2 1F 97
4430: A4 BB 90 19 02 04 08 93 61
4438: B9 EE 5E A8 26 19 92 83 ED
4440: 0F E8 E5 E9 64 80 A1 92 E0
4448: 89 27 78 84 04 1A 5D 05 FE
4450: 80 05 02 C2 A8 EE 24 6D 7D
4458: 01 20 3B 10 0C 1E 15 E0 B5
4460: 85 6A 18 44 E6 E0 DA A7 A5
4468: 2F 07 03 93 34 B4 A2 DA 78
4470: DC C8 D2 C1 01 12 03 D2 39
4478: 51 00 16 91 01 10 11 0C FB
4480: 44 A0 39 00 15 08 56 22 12
4488: 41 E6 DC 37 40 05 9A 0B D0
4490: B6 66 0E 80 6C FA D0 00 C8
4498: 92 06 AE 43 26 F9 E5 D9 B4
44A0: 40 06 18 03 A0 71 07 77 4E
44A8: 68 46 40 05 86 2E A0 09 86
44B0: C3 F8 97 0E 20 3C 9D 05 5F
44B8: 20 F9 D7 02 9B D3 69 01 EA
44C0: 16 7A F2 C5 C1 DB 99 27 85
44C8: 4E 07 03 58 8A 48 05 14 B3
44D0: D3 2B 3F 0D E2 4E 3C F3 83
44D8: 1B 0C 73 C5 2A 1D 0D 80 1D
44E0: 84 02 E0 F1 2F 0E 40 02 9B
44E8: 01 AE 83 85 3D 88 02 0D 83
44F0: B7 C1 0D 18 75 F3 1A 0B A3
44F8: 52 21 00 0B 0E C0 82 93 AF
4500: 31 CC 66 FA 07 06 7F D4 F6
4508: 25 84 00 34 5E 3F BA 96 85
4510: 0C 62 C0 62 1B C9 E0 01 3A
4518: 24 AE 31 42 68 48 83 30 46
4520: 89 91 18 D8 52 F1 98 C8 B8
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4830: 2A 98 70 E4 29 1C 79 02 07
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48A8: 00 28 5A 10 0B 67 14 82 30
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49B8: 4D 10 90 87 8C D5 F0 F8 17
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50D0: C0 02 AF 35 07 2D 20 01 C9
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57A0: 79 E8 9F 83 7E 16 12 A3 86
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57D8: 58 BC F5 16 89 11 66 15 75
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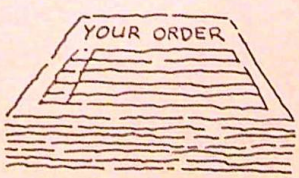

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HyperCard
Programming Without Pain

David D. Thornburg

Judging by its early months, HyperCard *is the most exciting new software product for the Macintosh since* Switcher. *Apple watcher and veteran developer David Thornburg sees* HyperCard *a bit differently than most—as a painless applications programming tool for the rest of us.*

When the Macintosh was introduced in January of 1984, it was heralded as the "computer for the rest of us." Implicit in this description was the idea that, compared with other computers, the Macintosh was transparently easy to use. If you could master a few simple mechanical skills (by learning to use a mouse), the highly visual user interface of the Macintosh, with its menus and buttons, cut training time to a minimum. Furthermore, because most Macintosh programs were built around similar user interface metaphors, most Macintosh users could learn how to operate a new program without having to spend hours reading a manual.

But if life is easy for the Macintosh user, it's been anything *but* easy for software developers. Programming the Macintosh is generally a horribly complex task that requires expertise in both a programming language and in the intricacies of the Macintosh itself.

When *HyperCard* was announced, it was seen by some as the answer to programmers' nightmares. Just as the Mac had become the computer for the rest of us, *HyperCard* may well become the language for the rest of us—a tool for programming without pain.

Just What Is *HyperCard?*

This question isn't easy to answer. *HyperCard* has so many facets and capabilities that it's almost chameleon-like in its abilities. Because this program is now bundled with all Macintosh

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This year, over $1.5 *billion* worth of digital electronic music instruments—keyboards, guitars, drum machines, and related equipment—will be sold in the U.S. alone. Who's buying this new-tech equipment? Not just progressive musicians and professional recording technicians, but also thousands of people who have never touched a musical instrument before. And there's good reason why.

Something called MIDI (Musical Instrument Digital Interface) has suddenly transformed musical instruments into the ultimate computer peripherals . . . and opened up a whole new world of opportunity for the person who knows how to use, program, and service this extraordinary new digital equipment.

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computers and has been the subject of numerous articles in many magazines (including COMPUTE! magazine), the question *What is it?* is being asked more and more.

People' first exposure to *HyperCard* is usually through one of its applications—a date book, phone list, or other simple database application. *HyperCard* comes equipped with a collection of useful tools, ranging from address books to phone dialers. This assortment is so useful that some people think *HyperCard* is simply the delivery system for a nice collection of Macintosh applications. That's only partly true.

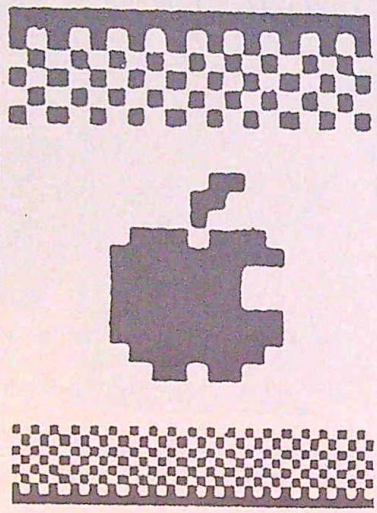
Once people play with *HyperCard*'s applications, some start to look like database tools. The ease with which new database templates can be created makes some people think of *HyperCard* as a database language. That's only partly true, too.

After becoming bold enough to "lift the hood" and peer at the construction of a *HyperCard* application, many people conclude that *HyperCard* is a complete programming language that's been tailored to meet the needs of nonprofessional programmers who want to create their own custom applications for the Macintosh. Again, only partly true.

And, as will quickly become apparent, I think of *HyperCard* as a programming language that's custom-made for the capabilities and style of the Macintosh. Just as Applesoft BASIC became the de facto standard language for casual programmers of the Apple II, *HyperCard* is destined to fill this role for the Macintosh.

Myth, Metaphor, And Computers

There is a common myth in the field of computer science that programming is hard. This myth is supported especially well in the traditional Macintosh programming environment because most programming languages are not designed to support the underlying style of Macintosh applications. For instance, most Macintosh programs present the user with a screen on which any of a great number of things can be done at any time. Menus can be pulled down, buttons can be clicked, text can be entered into fields—on and on. Furthermore, many of these activities can be performed in any sequence. This "do anything in any sequence" mode of operation (called an *event-driven* program) seems foreign to the linear sequential structure of programs created in most traditional languages. Most languages—C, Forth, Pascal, BASIC—support the creation of programs built from clusters of subroutines which are in turn controlled by a main program. This idea of a single boss controlling a set of subroutines is just the reverse of the way the user sees the Macintosh. From the user's perspective, Macintosh programs are built from a set of seemingly independent entities that collaborate to create a functional whole.



If programming on the Macintosh is conceptually hard, it is because programming the Mac in most languages is like pushing a piece of wet spaghetti up a straw: Possible, but something to try your patience.

All programs are metaphors at some level. The success of a computer program is measured by its ability to let you think that the items you're working with are "real." In the case of the Macintosh, these items include highly-developed visual metaphors built around objects such as buttons, windows, and menus. The power of these metaphors comes with a price, however. Ninety percent of a programmer's time is spent in creating the user interface metaphor. The heart of the Macintosh's Toolbox (the built-in routines stored permanently in its ROM) is so powerful and complex that Apple's reference book, *Inside Macintosh*, is close to 1000 pages long.

HyperCard, though, circumvents that immense commitment of programming time to Macintosh's user interface. On the surface, *HyperCard* is a programming environment that uses the Macintosh interface as a vehicle for programming. Constructing a program is (in some cases) very much like the process of using one—the programmer draws objects on the screen (such as windows and buttons), and *HyperCard* turns those mouse clicks and movements into a program. This technique is called *direct-manipulation programming* and represents, to my way of thinking, the next step in the evolution of programming languages.

The underlying visual metaphor for *HyperCard* is that of a stack of index cards blended with traditional Macintosh objects like buttons and text fields. The creator of a *HyperCard* application has complete freedom to lay out each card as he or she chooses. Buttons and text fields can be created as easily as they are used.

HyperCard's Roots

HyperCard was designed by Bill Atkinson, the Apple Fellow who designed *MacPaint* and a Rolodex-like program written years ago for the Macintosh. While *HyperCard* can be used to create programs that have the look and feel of this older program, its roots lie much deeper in the history of computing.

There are two main branches to *HyperCard*'s roots—hypertext and object-oriented programming. Each of these provides an important foundation for *HyperCard*.

Hypertext

In July of 1945, President Roosevelt's science advisor, Vannevar Bush, published an article called "As We May Think" in the *Atlantic Monthly*. In this article

(which was reprinted in *CD ROM: The New Papyrus*, a book by Microsoft Press), Dr. Bush suggested that someday one might be able to read a book on a display screen and, on coming to a new word or idea, be able to jump to another document that explores this idea in some depth. Years later, the idea of creating multiple links between documents captured the imagination of Ted Nelson, who coined the word *hypertext* to describe documents in which any word or phrase can act as a link to any other word or phrase in any document in the user's library. Nelson's own Project Xanadu is an attempt to explore hypertext on a world-side scale. More prosaically, his vision has encouraged many programmers to construct hypertext environments of their own.

Anytime you can point (whether you're pointing with a finger, a mouse cursor, a keyboard-driven cursor, or any other tool) to an object on a display screen that then opens a window or leaps to another document containing information on the item you've selected, you're using an example of hypertext.

This model of browsing through a workspace at many levels is ideally suited to computers, but to the Macintosh in particular. Macintosh users are used to the idea that, by clicking the mouse on an object, something interesting will happen. The richness of hypertext is increased when it's extended into the graphics domain. For example, parts of a picture can be equipped with transparent buttons that can bring more detailed images into view.

The whole domain of hypertext (although without the name) was opened to Macintosh users in 1984 by the introduction of *Filevision* from Telos. Tragically, this pioneering product was misunderstood by computer dealers and, apart from its loyal band of followers, *Filevision* never got the support it deserved. *Zoomracks*, by QuickView Systems, is another ground-breaking hypermedia product (for the Atari ST and MS-DOS machines) that has also been misunderstood and thus underappreciated.

Hypertext In *HyperCard*

Creating hypertext documents is quite easy in *HyperCard*. Let's illustrate the process by contructing a "make your own adventure" story in which the reader is able to branch throughout an interlinked document using options given at the end of each page.

HyperCard supports several user levels (see Figure 1). For the creation of your hypertext application, the Authoring level provides all the tools you need.

To create an application of this sort, you should first create a *storyboard*—a map showing the various pages of the adventure and the links between the pages. This map is then a guide for the creation of your application.

The next step is to create the background image that will be seen by the user as he or she works with your program. *HyperCard* has a built-in *MacPaint*-like graphics utility with which you can draw any image you want (Figure 2). An image drawn as the *background* (a *HyperCard* term) appears on each card of the stack.

Next, a text field is placed on the background to hold the text of the story. The addition of text fields to a *HyperCard* program is very easy. The programmer is provided with a wide range of choices for the style of the field as well as for the font used (Figure 3).

In this example, the Venice typeface was chosen, and the text field was defined to fill the entire white space of the sheet of paper (Figure 4).

The background design is done. Now, using the storyboard, each page of the document is typed, along with the user's options (Figure 5).

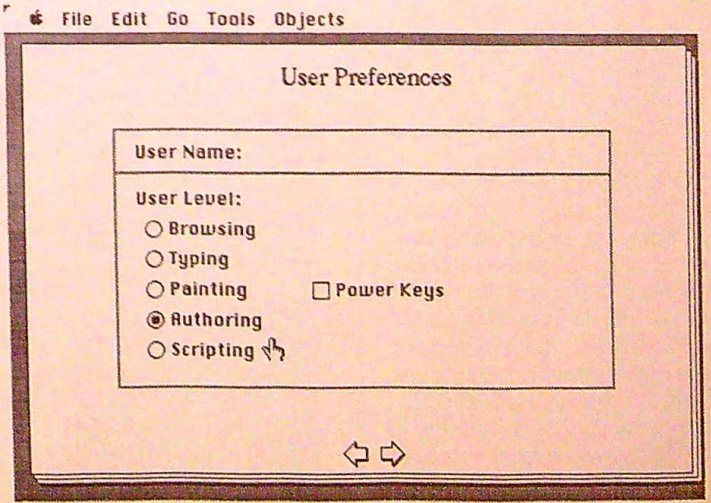
With this part of your stack complete, all that remains is to place transparent buttons over each of the user's options, then link those buttons to the appropriate cards (Figure 6). *HyperCard*'s button tool offers a wide variety of button styles, including transparent buttons which can be placed over any object on the screen (Figure 7). Button placement and size is controlled with the mouse.

After buttons are in place, each of them can be linked to a destination card by moving to that card and clicking the mouse (Figure 8).

As you've seen, creating hypertext applications in *HyperCard* is easily mastered. It requires no "programming" skills and shows off the power of *HyperCard*'s direct-manipulation programming environment. A large number of excellent *HyperCard* applications can be created completely at this level.

For those jobs requiring more elaborate computing abilities, *HyperCard* provides the user with access to an object-oriented programming language—HyperTalk.

Figure 1



HyperCard *supports five user levels. The Authoring level is appropriate for creating hypertext applications.*

Why Object-Oriented Programming?

To describe object-oriented programming, it's probably best to back up a bit to explore the structure of event-driven programs created in traditional languages. These traditional languages (C, Forth, Pascal, BASIC) are used to create a program which is one continuous listing. Programs may be divided into separate modules, and these modules may interact with each other in certain well-defined ways, but programs still consist of a single linear text document. As mentioned earlier, this style of programming doesn't mesh well with applications that can offer a wide range of choices at any one time. To support such a program, a programmer usually constructs an *event loop*, something like

```
STARTLOOP
    IF the user clicked the mouse
      button THEN DO TASK A
    IF the user typed a letter THEN
      DO TASK B
    IF the user moved the mouse
      THEN DO TASK C
    ...
GO TO STARTLOOP
```

Suppose the user clicked the mouse. Task A would then have to find where the mouse was and respond accordingly. Depending on the options available, the modules responsible for handling all appropriate mouse clicks could be scattered over several pages of the listing. Furthermore, there is no correspondence between the location of subroutines in the listing and the buttons or menu items as seen on the screen. This makes *debugging* (finding a program's mistakes and correcting them) a time-consuming task.

Consider a different situation—one in which each button, text field, card, background, and stack of cards contained its own programs. In this case, if a mouse click on a button doesn't perform the desired task, the programmer could look at the listings associated with the unresponsive button, without having to take on subroutines which have nothing to do with the desired task.

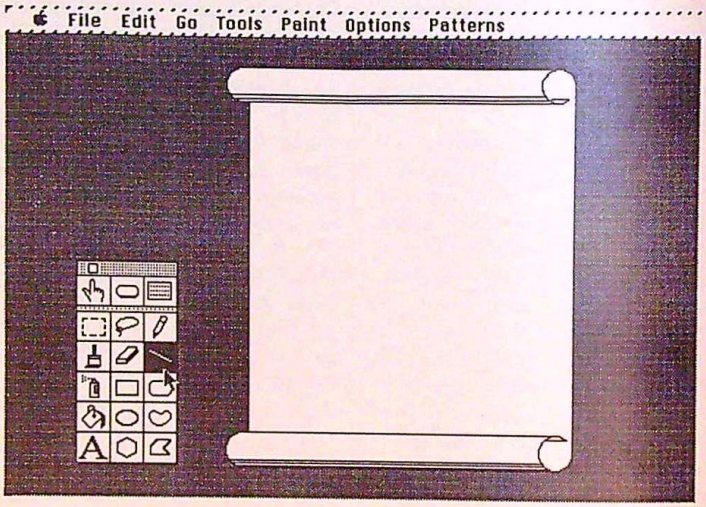
By connecting programs (usually called *methods* or *handlers*) with each object, building an application is greatly simplified. For example, a button that has some action (like advancing to the next card in a stack) can be copied from one application and pasted into another. The new button comes not only with its graphic image, but with the programs needed to support its operation. This high level of modularity in object-oriented programming encourages the creation and distribution of complete functions which can then be assembled into other applications or shared with other programmers.

Objects Talk To Each Other

If an application consists of a large collection of handlers, each associated with its own object, how do these programs know when to run? In traditional languages, a command is given to start the program, which then stays in the event loop until the user does something that the event loop can handle.

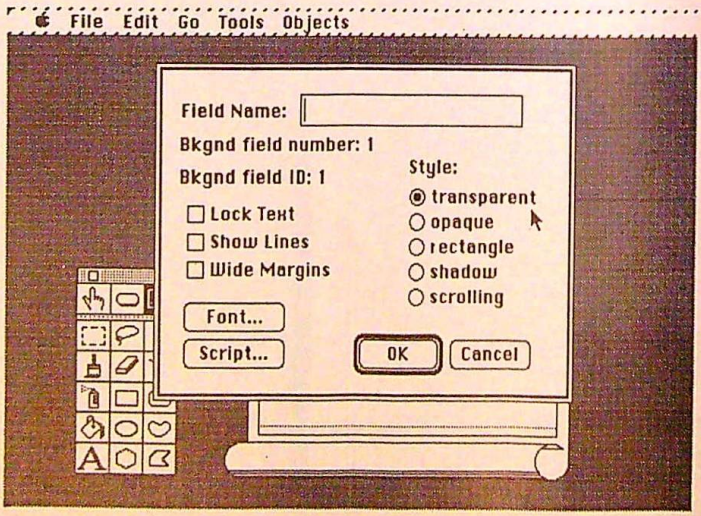
Object-oriented programs don't run this way. Instead, think of the handlers as sleeping programs that stay out of the way

Figure 2



HyperCard's paint tools allow for the easy creation of any background or foreground image. This simple background is perfect for the adventure game you're building.

Figure 3



Text fields are created by choosing the desired characteristics from this list of options.

until they receive a message to wake them up. For instance, a button might have this handler:

```
on mouseUp
    go to next card
end mouseUp
```

This program lies dormant until the user clicks the button. This action sends the message *mouseUp* to the button. Since there's a handler for this message, the action is performed and the program goes back to sleep. If this button didn't know what to do with this message, the message would be passed to the field or card beneath the button, and so on up a hierarchy, until a handler was found. If no handler is found, the computer just beeps and waits for the next message.

Notice that the same message can result in completely different actions for each object. A mouseUp message that advances to the next card for one button may print the contents of a text field for another button. Because the handler is linked directly to the object, there's no confusion as to what task should be performed.

HyperTalk—Creating Scripts

How do buttons know what to do? The answer to this question lies hidden in *HyperCard*'s programming language—Hypertalk.

Lifting the hood on *HyperCard* is much like lifting the hood on a car. Some people know what to do and can learn simply by tinkering. Others need to have a well-prepared plan of action. Still others are so overwhelmed by what they see that they slam down the hood and wait for professional help.

If you are at all intrigued by the inner workings of *HyperCard*, you should buy a copy of Danny Goodman's *Complete HyperCard Handbook* (Bantam Books, $29.95). This 700-page tome contains all the information you need to master *HyperCard* and HyperTalk. [Ed: Other books on *HyperCard* will follow, including a fast reference called *Quick & Easy Guide to HyperCard* (COMPUTE! Books, $10.95).]

Programming in HyperTalk is called *scripting*, and this level must be selected from the User Preferences before you can lift the hood on an application.

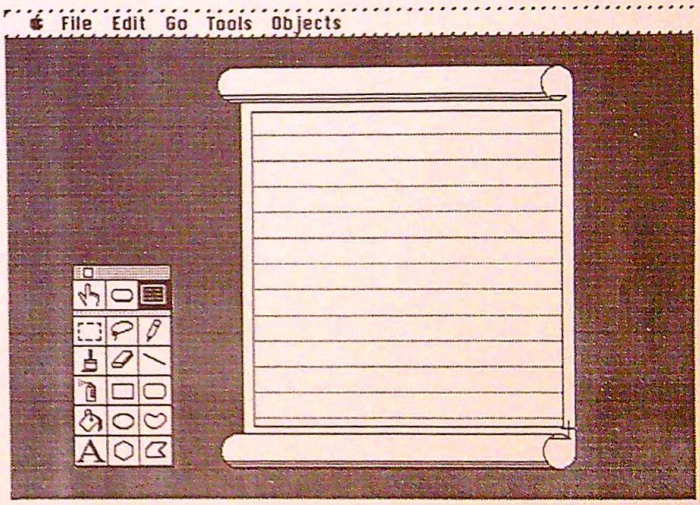
HyperTalk scripts are easy to read. For example, this button script opens a text file on the user's disk and copies the contents of all of the card's text fields into that file.

```
on mouseUp
    put "Untitled" into fileName
    ask "Export text to what
      file?" with fileName
    if it is empty then exit
      mouseUp
    put it into fileName
    open file fileName
    repeat with i=1 to the
      number of fields
        write field i to file
          fileName
        write return to file
          fileName
    end repeat
    close file fileName
end mouseUp
```

Even without a programmer's manual, you'll probably be able to tell exactly what this handler is doing. The command *ask* creates a standard Macintosh dialog box for filename selection. All other commands should be fairly obvious.

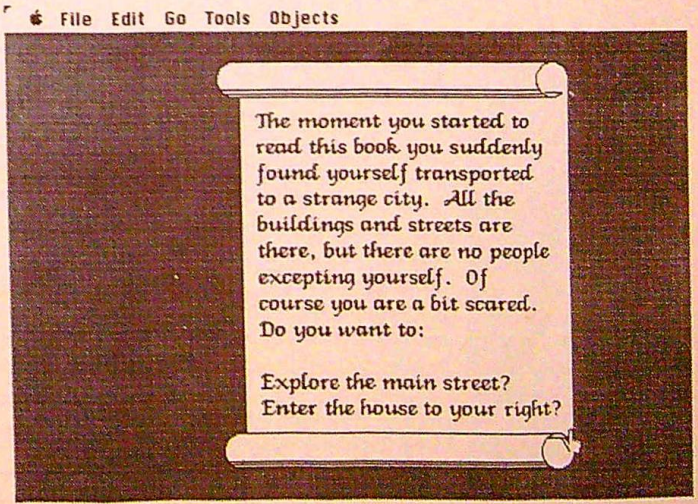
The *HyperCard* team worked hard to create a language that was as English-like as possible, yet still was unambiguous. For instance,

Figure 4



Placing text fields in HyperCard *is as easy as drawing and moving a rectangle.*

Figure 5



Once the fields are created, each card's text is typed just as though you were using a word processor.

the instructions *go to card 5* and *go to the fifth card* produce the same result.

A sample *HyperCard* application built from HyperTalk is shown in the "Computers and Society" column in the February 1988 issue of COMPUTE! magazine.

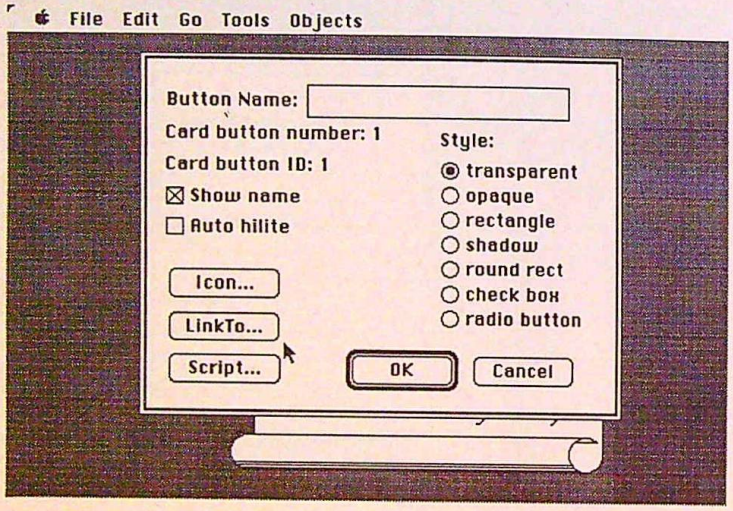
What's Wrong With *HyperCard*

While there is a lot to like in *HyperCard*, it also has some faults. If you want to use *HyperCard* to build database applications, you may find that its reporting structures are far too limiting. For example, you can print selected fields from *all* cards, but you can't make printouts of selected cards based on the values of a particular field. If you want to update a printout of your address list, for example, by printing all entries made after a certain date, you need to first create a new file containing only these entries, then print a report from this new file.

The printer interface for *HyperCard* is painfully slow, even when printing text-based reports. This slowness and lack of good reporting capabilities make it seem that printing was added as an afterthought.

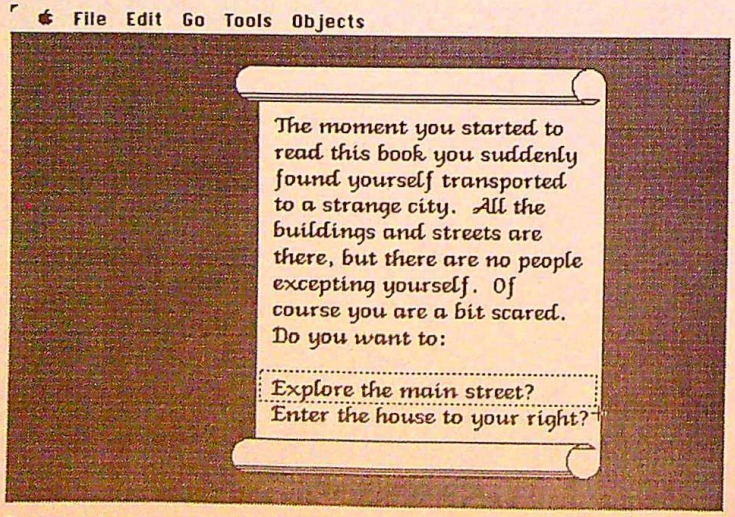
Another problem with *HyperCard* is that HyperTalk scripts run quite slowly. This lack of speed comes from several sources. First, HyperTalk is an interpreted language of great sophistication. In other words, HyperTalk's statements must first be read by the computer, then be sent through an interpreter which translates the English-like commands into instructions the computer can understand. Second, many HyperTalk activities make use of the Macintosh Toolbox ROM—many of these procedures are also slow. Perhaps Apple will create an incremental compiler to allow handlers to run faster. This would greatly increase the utility of *HyperCard*, especially when it is being used to construct large applications.

Figure 6



Creating buttons in HyperCard *is much like building text fields—selections are made from a list of options (note the LinkTo choice).*

Figure 7



Button placement and size is totally under the user's control.

What's Right With *HyperCard*

These problems aside, *HyperCard* is a joy. Excepting for Smalltalk, NEON, and a few other object-oriented programming environments, its HyperTalk goes where no language has dared to tread. The highly visual aspect of *HyperCard* lends a concreteness to its objects, which is something that's lacking in other object-oriented languages; and its direct manipulation environment makes the creation of Macintosh applications extremely simple.

Best of all, *HyperCard* has created a new class of software. When the Macintosh first came out, many users felt that they didn't have the skills needed to create pictures with *MacPaint*. Several companies created disk libraries of clip art that people could use to illustrate their documents.

Now, with *HyperCard*, clip art goes beyond graphics to program modules themselves. Because *HyperCard* objects (including their handlers) can be copied and pasted as easily as a graphic image, many users will be able to construct sophisticated applications without mastering HyperTalk. Instead, they will make use of HyperTalk-laden buttons that contain the handlers they want.

Within a few weeks of *HyperCard*'s introduction, the Macintosh-specific electronic bulletin boards and commercial infor-

Hypertext And The Apple II

The glamor of the Macintosh seems to have eclipsed the Apple II, much to the irritation of those who have supported Apple since its beginning. Of the Apple II line, the Apple IIGS has been getting the lion's share of attention—mostly because of its Macintosh-style interface. And yet there are millions of Apple IIe's and IIc's waiting to benefit from the power of Mac-like tools.

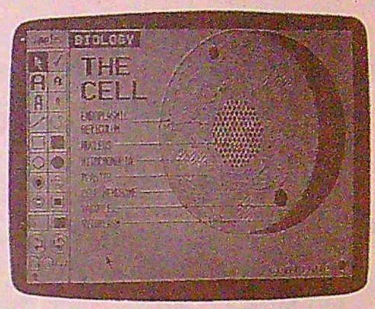
One of the trick questions I like to ask when I'm visiting with Apple executives is *When will there be a version of* HyperCard *for the Apple IIe?* The answer I get varies with the person I'm talking to , but it usually boils down to a litany of the problems with creating a program of this scope that has to run on a 128K machine. The project is interesting, I'm told, but the *reality* is that the IIGS is more likely to be the next home for a *HyperCard*-like product.

The reason I called my query a trick question is that I have had a copy of a commercially-available Apple II-based *HyperCard* product running since early 1985. The product is called *Tutor-Tech* and is published by TechWare, a small but extremely talented group in Florida. *Tutor-Tech*'s Teacher/Student package, with one disk for the teacher, another for the student (which can be copied up to 50 times), costs $195.

To my amazement, I've yet to find an Apple employee who has even heard of these folks.

So what is *Tutor-Tech*?

It was designed as a direct-manipulation hypertext-based authoring system that allows teachers and other non-programmers to create sequences of frames which can be linked together with buttons, just like *HyperCard*. The only major feature missing from *Tutor-Tech* is HyperTalk. *Tutor-Tech*'s button scripts are restricted to jumping to other pictures, although buttons can also increment or decrement the user's score (in anticipation of its use as a lesson tool.)

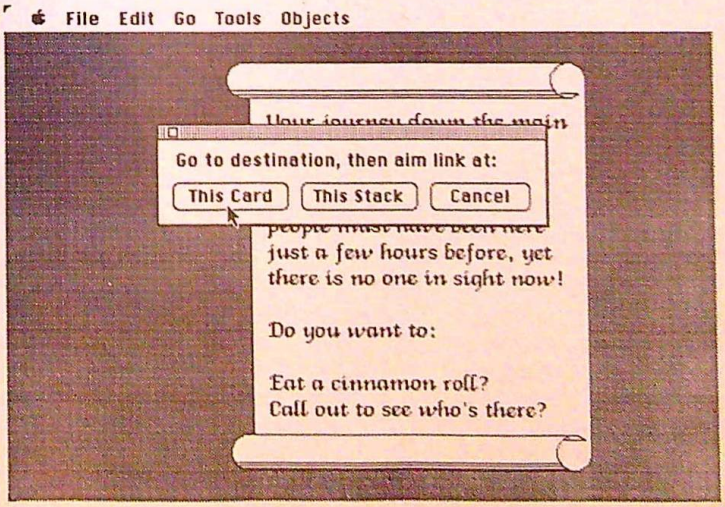


As with *HyperCard*, *Tutor-Tech* supports a sophisticated set of tools for creating graphic images. And, like *HyperCard*, *Tutor-Tech*'s buttons can be visible or invisible and any *Tutor-Tech* card can be linked to any other card—or even to other stacks on the disk. The adventure story application created in *HyperCard* can be created just as easily in *Tutor-Tech*.

Who knows, Apple may even notice that this company exists.

TechWare
P.O. Box 1085
Altamone Springs, FL 32715
(305) 834-3431

Figure 8



The LinkTo selection connects a button with any card in the stack so that, when the user operates the application, clicking on a choice immediately brings the appropriate card into view.

mation services (CompuServe, GEnie, The Source, Delphi) were filling with public-domain buttons and stacks. The growth in this area is going to be tremendous.

So What Is *HyperCard*?

HyperCard is a hypertext-based, direct-manipulation, object-oriented programming language. It's also the key that unlocks the magic of Macintosh programming for those of us who haven't the time or inclination to spend years mastering traditional language.

With this one language, Apple has turned the Macintosh into a flexible piece of modelling clay that can be shaped into beautiful forms by anyone who wants to create his or her own application. Programming without pain has finally come to the Macintosh.

David Thornburg is a Contributing Editor for COMPUTE! magazine, and he regularly appears in other computer-specific publications. He welcomes letters from readers and can be reached at P.O. Box 1317, Los Altos, CA 94023.

How Real Can You Get?

Simulations Are Better Than Ever

Tom Netsel, Assistant Features Editor

Boot up a simulation on your Apple and you don't just watch the action unfold, you become a part of it. More than just a game, a simulation lets you become a character in history, a scientist, a jet pilot, an elected official, or maybe a truck driver. Take a look at what simulation designers put into their products, and see how educators put them to use in the classroom.

Think you've got what it takes to be a hotshot fighter pilot?

Could you stand a jet on its nose and dive on an enemy MiG at Mach 2, line up your gun sights, and still avoid an incoming SAM that's locked onto your exhaust pipe?

What if you were transported back in time and found yourself sitting on an ox-drawn wagon bound for Oregon? Could you survive flooded river crossings, outbreaks of cholera, and similar hardships pioneers faced on their 2400-mile trek across America?

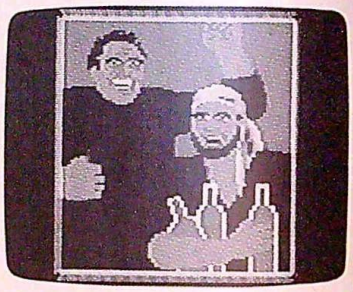
Few people get the chance to experience the thrill of pushing a jet fighter to its limits, and the rugged life of the pioneer is gone forever, impossible to recall. Impossible, that is, unless you boot up some of the sophisticated simulation software that's available for Apple II computers.

Computer simulations let you experience activities that are physically impossible, too dangerous, or too expensive to perform at home or in the classroom. A chemistry student can mix "computer chemicals" without fear of blowing up the lab. A history student can lead a band of pirates and discover what skills and qualities a buccaneer needed in the 1600s to survive and thrive on the Spanish Main.

Hoist The Jolly Roger

That's exactly what Sid Meier, vice president of product development at MicroProse, had in mind when he designed *Pirates!* "We thought it would be neat to put yourself in the position of being a pirate and go back into that world for a while," he says. "Would I make a good pirate and could I survive in that kind of environment?"

Pirates! is a carefully researched historical simulation that spans the the Caribbean from the days of the Silver Empire (circa 1560) to the Pirates' Sunset (circa 1680). Users may elect to reenact Henry Morgan's conquest of Panama, Francis Drake's raid on the Silver Train, or any of several famous expeditions.



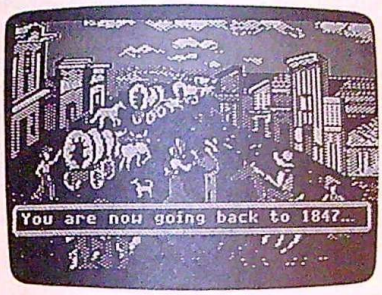
Pirates *includes graphics screens and simulation strategy.*

When you're ready to test your own mettle, you can assume the role of a young Englishman who rebels against his life as an indentured servant. Before you take to the high seas, though, familiarize yourself with the program's documentation. If you don't know where to find Spanish wealth, the men you hope to command will be reluctant to follow. Don't neglect your fencing skills, either. Your expertise with a rapier, longsword, or cutlass will be tested many times, and a sluggish response with the joystick can result in your defeat and imprisonment.

Once you've seized command of a vessel, you can choose to plunder at will or place your ship in service to the British crown. *Pirates!* gives you a large scrolling map of the Caribbean and an astrolabe to help with navigation, but you still must contend with strong winds, coral reefs, supplies,

and the crew's morale.

Pirates! gives you the chance to engage in combat on the high seas, employing cannon and tide to your advantage. If you board the enemy, once again your skills with a cutlass may decide the issue. If you succeed in capturing your opponent's ship, you must decide whether to plunder its cargo and send it to the bottom, or sail it back to port as a prize.



In Oregon Trail, *you play the part of a hardy pioneer heading west.*

Pirates! offers tremendous depth as a simulation. It's much more than battling enemy sailors with your joystick/cutlass. Time passes during play, allegiances shift, and wars break out, placing strategic demands on players. "I imagine myself playing the game as I develop it," Meier says, "so I try to develop a game that I enjoy playing and spending time with. When I started *F-15 Strike Eagle*, I thought it would be neat to feel what it would be like to fly a high-tech airplane and learn how to use all the different equipment they have on it."

When Meier designs a simulation, he wants to find out how an ordinary person fares in larger-than-life situations—whether it's piloting a jet, commanding a submarine, or leading a band of pirates. Attention to detail is a must when designing a successful simulation, but care must be taken not to recreate a situation too faithfully, Meier warns. "Real life most of the time is pretty boring. It's not something you'd want to watch on a TV screen. We try to give you the concentrated essence of a simulation—the most interesting, most exciting, and the most educational parts," Meier says.

MicroProse has a research department that checks the historical accuracy of its simulations. "We dedicate one person in a project to coordinate the research and that person usually ends up writing the manual," Meier says. Historical high points become part of the program, while many interesting items less suitable for game-type treatment become part of the manual and supplemental documentation.

Westward Ho!

Another program with a strong historical slant is MECC's *Oregon Trail*, a game that puts players in the role of a pioneer in the 1840s, crossing the United States by wagon. It first capitivated students in 1975 when MECC was a consortium funded by Minnesota schools and universities. In the days before personal computers, member institutions called MECC's mainframe computer and students accessed *Oregon Trail* by teletype.

"Simulations are very, very powerful tools."

MECC, now a public corporation, revamped *Oregon Trail* in 1985 with improved graphics and sound, and released it for the Apple II. How well you manage on the journey depends on your date of departure, the supplies you buy in Independence, Missouri, and the supplies that are lost or stolen en route. Dangerous river crossings, vanishing trails, outbreaks of disease, and broken equipment all have a bearing on whether you and your family survive the journey to Oregon.

The program encourages players to analyze problems and make decisions; then, the computer reveals the consequences of those decisions. As in real life, correct moves do not always spell success. Luck and random disasters play an important part in *Oregon Trail*. A late snow storm could bury your wagon just when you think you can smell Pacific breezes.

"Simulations are very, very powerful tools," says Craig Copley, manager of advanced development at MECC. "We try to make a computer respond in a way that a textbook could never do," Copley says. " A film or any other medium cannot respond or adapt to the student."

Scholastic's Operation: Frog *simulates a typical high school biology experiment—dissecting a frog.*

Robert Guernsey, a teacher at Shortridge Jr. High in Indianapolis, Indiana, agrees. "Students can set up and manipulate situations that give them data," he says. "This information enables them to see or predict results. They couldn't do this by reading a book; it's just not possible."

Guernsey uses *Air Pollutiom* and *Water Pollution*, two programs by Educational Materials & Equipment that give students the tasks of controlling a community's air and water quality. The computer sets up parameters, such as the number of cars on the streets per day, the levels of carbon monoxide emitted, and federal minimum standards that must be met. The students then devise scenarios that recommend more public transportation or a reduction in speed limits as means to improving the environment.

"They have to manipulate certain variables to get the desired result, which is air or water of a certain quality," Guernsey says. "That's something we can't go out in the field and study, but it is something the computer can help you do."

If you're studying earth sciences, the environment, or ecology, these two programs can easily be included in a lesson plan. Other simulations are harder to classify. Copley said a MECC survey indicated teachers are in-

terested in problem-solving packages that give students practice in hierarchical thinking. The survey also revealed that teachers want to see more science simulations.

There's A Zoyon Loose In My Yard

Copley's team came up with a program he feels can be used in a science clasroom and in a wide range of areas. In *Zoyon Patrol*, the user becomes the director of a government agency whose sole purpose is to help rescue a group of strange, endangered creatures called zoyons, who have wandered into your city. Just be certain to stay within your budget and maintain a favorable public opinion.

You gather information about these creatures from messages people in your city send you via electronic mail. They report about the creatures' size, color, and whether they have scales or hair. When you have several descriptions from witnesses, try to identify the animals by matching their reports with information in the program's database.

When you've made a probable identification, you get more information about a particular creature's likes and dislikes. This will help you decide which particular trapping mechanisms to use in its capture. "There are several harmless box or burrow-style traps at your disposal," Copley says. Once you've successfully captured a creature, you can send a team of handlers out to photograph it and return it to its native habitat.

The program takes students through the process of gathering information, processing it, and developing a hypothesis. That hypothesis is tested on the creature. "We think it's a fairly good-sized animal," Copley says. "It's covered with hair and it's black. And we think that's probably a *quackerat*. The quackerat likes nuts and it nests in trees, so we put out a trap of the right type to capture the animal." If you make a wrong guess, the creature avoids the trap and more angry messages from distraught citizens pour in.

After playing the game a few times, you start to learn more about the 9000 inhabitants of your city. More and more of them send you messages as you play higher levels of the game, and 2 of the 40 different creatures can be loose at one time, adding confusion to the reports.

"*Zoyon Patrol* does not teach any specific course," Copley says, "but it is designed to exercise the student's problem-solving skills. I think the game element is a key to holding the student's attention. To read about problem-solving is one thing, but to experience it is another environment."

"One of the things a computer can do well is let you take an active part. . .you can actually make decisions and affect the outcome."

What Happened To The Anasazi?

Harcourt, Brace, Jovanovich has released a series of problem-solving simulations called *HBJ Historian*. Each program sets up a problem, then asks students to think about and draw conclusions based on research from onscreen documents.

Anasazi Civilization asks students to form a hypothesis as to why the Anasazi Indians abandoned their stone cities at the height of their civilization in the American Southwest. *The United States in Vietnam* poses questions from a more recent era. It sets the historical stage and asks what decisions presidents Eisenhower through Nixon made regarding Vietnam. Students can see excerpts from contemporary articles and documents to gain background information. What did the presidents need to know to make valid decisions and with whom should they have conferred?

The series, which includes such titles as *Boom Town, The Labor Movement Before 1915, Lincoln and Fort Sumter*, and *Spaniards in California* was devised by Dr. Willis Copeland, a history professor at the University of Santa Barbara, along with 17 social studies teachers. The group came up with a prototype for the series, which was further developed at HBJ. It was designed primarily for classroom use and runs on an Apple with 128K of RAM.

Designers Like Apples

Apple still dominates the school market, and that represents several pluses for software designers. Sid Meier says he likes the double-high-res graphics on the Apple II. "We found we can do more with it than we can on other machines, and Apple's extra memory compared to the Commodore and Atari is a real help."

Meier also likes the type of people who buy Apples. "They seem to be more serious users of computers. They appreciate the kind of depth, detail, and realism we try to put into our software. They're not so much the arcade-style gamers."

Another software designer who likes programming for the Apple is Phil Miller, editorial director of Scholastic Software. "Until the IIGS came out, there was only one graphic standard we had to deal with. The fact that we were dealing with one standard meant we could create with some confidence, and that the user would see on his screen what we designed on ours."

Scholastic has long been a leader in educational software, primarily in areas of social studies and language arts, but the company felt it needed more scientific programs to balance its software offerings. When Guy Nouri at Interactive Picture Systems approached Scholastic officials with a unique science simulation, they soon struck a development agreement for *Operation Frog*.

Vivisection Simulation

By simulating actual scientific experiments, *Operation Frog* turns any classroom into a biology laboratory. Students learn the basic steps of dissecting a frog without special equipment or the environment needed for working with preserved specimens. And, best of all, there's no smell of formaldehyde.

"We've marketed it as a supplement, not as a replacement for anything," Miller says, "although some people have looked at it as a replacement for frog dissection."

Students learn dissection and anatomy by dividing and identifying a frog's internal organs, but it must be done in a logical order and in a precise manner. The various procedures must be performed in a prescribed order, using the proper tools. In addition to learning biology and anatomy, students also gain experience in logic and decision-making by selecting the proper tools and procedures for the dissection process. *Operation Frog* covers these steps and procedures using a computer monitor instead of a real specimen.

Each organ of the frog can be examined and studied more closely with the program's "magnifying glass." Once the parts have been removed, *Operation Frog* lets young scientists attempt to reconstruct the electronic amphibian. If they do it correctly, they're rewarded by seeing the frog hop off the screen. "The kids have a chance to practice it several times," Miller says. "It's not the one-shot deal that most dissections are."

The documentation clearly points out that *Operation Frog* does not go into the detail or cover the same material as an actual dissection, but the fact that it does not use a real frog has made the program popular in some circles. "You don't have the same emotional baggage that goes along with a real frog dissection," Miller says.

When public television's *Innovations* did a program about the ethics of dissections, *Operation Frog* was mentioned as a compromise. It also came to the aid of a squeemish student who needed to perform a dissection or flunk biology on an episode of *Fame*. Miller says many school officials are considering *Operation Frog* as they take a hard look at whether their schools should be doing dissections.

While school officials and antivivisectionists debate the educational and ethical merits of *Operation Frog*, most teachers agree that computers are excellent tools for presenting material in a manner that will keep a student's attention. Those that make use of graphics are especially effective. "I steer away from tutorials that are pure text," says Robert Guernsey. "They're dry as a bone."

The Interactive Advantage

Books are better at presenting masses of textual material, and movies still have the edge when it comes to visuals, but computers have the interactive advantage. "One of the things a computer can do well is let you take an active part in a simulation, and emphasize those parts where you can actually make decisions and affect the outcome," Meier says. "We're not going to compete with books and movies on their terms, but we're going to emphasize what a computer can do well, which is let you be interactive in a situation. We're emphasizing those situations where the player controls the flow of the story."

There are times, however, when simulations can instruct by controlling the player. Jackie Griffith teaches a class of third graders at Hendersonville Elementary School in DeKalb County, Georgia, and she's found that simulations can help her teach students basic skills they're too young to have experienced. If they forget to do things adults take for granted, the computer reminds them of their errors.

"As a truck driver in *Cross-Country USA*,, you may have to go to North Carolina to pick up a load of tobacco," she says. "If you forget to turn on your windshield wipers when it's raining, you may have a wreck."

Transporting cargo across the United States helps teach geography, Griffith says. The computer also reminds her students that if they drive too long, they get hungry. If they get tired and have to stop at a motel, the computer keeps a tally of how much they spend. Young truckers also learn the directions on a compass, how to read a map, and the names of cities along their routes.

Where in the World is Carmen Sandiego? is another program Mrs. Griffith uses in her classroom to teach geography. Your role as a rookie detective is to capture Carmen Sandiego and her band of thieves, who could be hiding anywhere in the world. You have to question suspects and unravel clues to figure out the whereabouts of Carmen and her henchmen.

Selected Simulations

Air Pollution ($47.00)
Water Pollution ($44.00)
Educational Materials & Equipment
P.O. Box 2805
Danbury, CT 06813

Cross-Country USA ($49.95)
Operation Frog ($59.95)
Scholastic Software
730 Broadway
New York, NY 10023

F-15 Strike Eagle ($34.95)
Pirates! ($39.95)
MicroProse
180 Lakefront Dr.
Hunt Valley, MD 21030

HBJ Historian Series ($150.00 each)
Harcourt, Brace, Jovanovich
Orlando, FL 32887

Oregon Trail ($55.00 for school edition, $19.95 for home edition; $59.00 for Apple IIGs)

Zoyon Patrol ($59.00 for IIGs. Home edition planned.)
MECC
3490 Lexington Ave. North
St. Paul, MN 55126

Where in the World is Carmen Sandiego? ($39.95)
Broderbund
17 Paul Dr.
San Rafael, CA 94903

Time's Up, Children

As popular as simulations are, they have their drawbacks. Boot an arcade-style game and you're immediately plunged into action. To get into a sophisticated simulation and probe its many levels, however, takes much more time. This depth of play contributes to its popularity, but can be a problem for a teacher whose class has a limited amount of time in a computer lab.

"We go twice a week to the computer lab," . Griffith says, "and we have 30 minutes. It's very frustrating for some children to stop in the middle of a program. In *Where in the World is Carmen Sandiego?*, I don't think any of my children have ever captured her. They're still investigating when our time is up."

Try Again

Despite the fact that her 24 students have to share 20 computers, and the young sleuths never have enough time to track down Carmen Sandiego, Griffith has high praise for computers and the role they play in education. On nights when parents are invited to school to meet with teachers, the students always make certain their parents visit the computer lab.

A third grader in Griffith's class recently led her parents to one of the Apple workstations. The class had been working on math problems, and the young girl had difficulty grasping the basics of long division. Griffith said the girl ran the same program repeatedly as she struggled with the lesson. That night in class the young girl pointed proudly at the Apple and told her parents something that might shame a human educator, even a patient one who has the best of intentions. "The computer is teaching me how to divide," the little girl said, "and it doesn't even frown at me. It just says, 'Try again.'" aa

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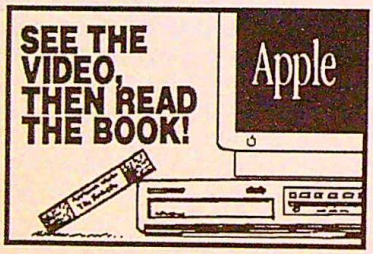

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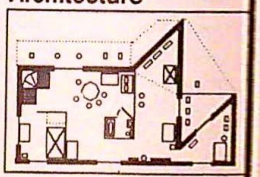

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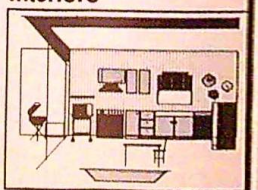

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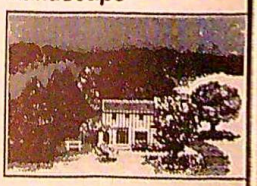

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Buyer's Guide
To Math Games

Mickey McLean

Apple II rules the schools. That's best demonstrated by listing the educational programs which run on Apple II computers. If you look hard enough, you'll find literally thousands of programs for the home and classroom that teach everything from decimals to dissection.

Even when you narrow the field to consider only educational games—those programs which include entertainment elements commonly found in arcade games such as animation, colorful graphics, sound, and joystick action—you're still looking at hundreds upon hundreds of packages.

This buyer's guide lists only those educational games which teach arithmetic or mathematics, or which reinforce math skills already learned. We picked math games for two reasons—arithmetic and mathematics are primary subjects in every grade level, and they lend themselves very well to games. Obviously, we couldn't include *every* math game for the Apple, but we feel we've covered the genre as extensively as possible.

In the table which follows, the various columns are self-explanatory for the most part. *Grade* indicates the appropriate grade levels and *Requirements* notes the memory necessary to run the program.

Game	Price	Publisher	Grade	Requirements	Description
Addition Circus	$44.95	Gamco Industries		48K	Students must answer math problems correctly before balloons reach a circus tent.
Alien Action	$46.00	DLM			Students battle aliens while they learn Roman numerals and greater than/less than comparisons.
Alien Addition	$46.00	DLM			An alien invasion game helps teach basic addition facts.
Alligator Alley	$46.00	DLM			Students must select the right answer in this number-words and negative integer teaching game.
Alligator Mix	$46.00	DLM			Students must feed apples to hungry alligators while increasing their skills in addition and subtraction.
Arithmetic Critters	$55.00 (3½-inch disk: $59.00)	MECC	K–2nd	64K	Students can learn to master basic math skills such as single-digit addition and subtraction using animal theme games.
Balancing Bear	$65.00	Sunburst	K–4th	64K	Addition and inequalities are visually introduced with a balance beam game.
Banker's Run	$37.00	Orange Cherry Software	3rd–8th	48K	The fundamentals of monetary arithmetic are taught in an arcade game.
Bannercatch	$49.95	Scholastic	4th–8th	64K	Students are taught the binary number system while they battle Max and his invading team of robots.
Bumble Games	$39.95	The Learning Company	K–5th	48K	Six games introduce number lines, number pairs, and graph plotting.
Bumble Plot	$39.95	The Learning Company	4th–8th	48K	Five games build on skills taught in *Bumble Games* including negative and positive numbers.
Campaign Math	$49.95	Scholastic	4th–12th	48K	Three games based on the election process teach students fractions, percentage, and ratio.
Challenge Math	$65.00	Sunburst	2nd–6th	48K	Whole-number and decimal operations are taught in games involving an alien, a dinosaur-like creature, and a mysterious mansion.
Circus Math	$55.00 (3½-inch disk: $59.00)	MECC	2nd–3rd	48K	Circus characters help students solve addition problems.
Coordinate Math	$55.00 (3½-inch disk: $59.00)	MECC	4th–9th	128K	This program contains revised versions of math games Snark, Nomad, and Radar.
Counters	$65	Sunburst	Preschool–1st	48K	Young students learn counting skills in this three-part animated program.

Game	Price	Publisher	Grade	Requirements	Description
Counting Critters	$55.00 (3½-inch disk: $59.00)	MECC	Preschool–K	64K	Five different programs teach children basic number skills.
Decimal Discovery	$46.00	DLM		64K	An oil drilling game helps students improve skills in comparing, adding, subtracting, multiplying, and dividing with decimals.
Demolition Division	$46.00	DLM			Students must fire cannons at tanks while learning basic division facts.
Division Shooting Gallery	$44.95	Gamco Industries		48K	Students shoot ducks down in a shooting gallery by answering questions correctly.
Dragon Mix	$46.00	DLM			Multiplication and division is taught in this game that features a dragon guarding a city.
Early Addition	$55.00 (3½-inch disk: $59.00)	MECC	1st–2nd	48K	Firefighters, airplanes, and jumping frogs help students learn simple addition.
Early Games	$34.95	Scholastic	K–2nd	48K	Nine games that help children learn basic math and language skills.
Explorer Metros	$65.00	Sunburst	4th–Adult	48K	Students learn metric capacity, mass, length, and temperature while exploring a planet.
Fast Track Fractions	$46.00	DLM		64K	This program combines a car racing game with fraction drills.
Fish Scales	$32.95	DLM	K–1st	48K	Six activities teach measuring and distance.
Fraction Concepts, Inc.	$55.00 (3½-inch disk: $59.00)	MECC	1st–4th	128K	Students learn fractions from the animated "Fraction Factory."
Fraction Munchers	$55.00 (3½-inch disk: $59.00)	MECC	3rd–Adult	128K	Students must avoid the dreaded Troggles while they search for fractional numbers, equivalent fractions, and expressions using fractions.
Fraction Practice Unlimited	$55.00 (3½-inch disk: $59.00)	MECC	4th–6th	128K	Students can learn advanced fraction problems from the "Fraction Factory."
Fractions, Decimals & Percent	$239.00	Society for Visual Education	6th–8th		Students must work with a secret agent to learn fractions, decimals, and percents.
Galaxy Math Facts	$175.00	Random House	1st–9th		Students maneuver their spaceship back to earth while practicing basic math skills.
Get to the Point	$65.00	Sunburst	5th–9th	48K	Three games teach students order of decimals and basic decimal operations.
Green Globs and Graphing Equations	$65.00	Sunburst	9th–Adult	48K	Students must enter equations to create graphs that will hit the green globs.
Growgins' Fractions	$55.00 (3½-inch disk: $59.00)	MECC	5th–7th	128K	Animated games, including a maze, teach ordering fractions with like denominators or like numerators.
Guinness World Records Problem Areas in Math: Addition	$99.00	Society for Visual Education	4th–6th		Students must use addition skills to free record holders from the evil Space Grogs.
Guinness World Records Problem Areas in Math: Division	$99.00	Society for Visual Education	4th–6th		Students can learn division skills as they walk down Division Street.
Guinness World Records Problem Areas in Math: Multiplication	$99.00	Society for Visual Education	4th–6th		Guinness trivia helps students learn multiplication.
Guinness World Records Problem Areas in Math: Subtraction	$99.00	Society for Visual Education	4th–6th		Students must track down Subtracto, the master criminal, by applying subtraction skills.
How the West Was One + Three × Four	$65.00	Sunburst	4th–Adult	48K	Students construct arithmetic expressions while advancing a stage coach and a locomotive in a race along a number line.
How to Weigh an Elephant	$14.95	Learning Technologies	Preschool–1st		Three games involving animals help develop concepts of weight, mass, and volume.
Identity 500	$37.00	Orange Cherry Software	2nd–6th	48K	Students steer a race car toward correct answers on math identities and number relationships.
Interpreting Graphs	$65.00	Sunburst	7th–12th	48K	Two programs, "Relating Graphs to Events" and "Escape," teach graph interpretation.
Learning to Add & Subtract	$14.95	Learning Technologies	Preschool–3rd		Picture clues help students learn addition and subtraction of single-digit numbers.
Let's Go Fishing	$14.95	Learning Technologies	Preschool–1st		Fishing games help teach children to develop number recognition and one-to-one correspondence.

Game	Price	Publisher	Grade	Requirements	Description
Math and Me	$39.95	Davidson	Preschool–K	128K	Twelve learning games introduce math-readiness concepts and build beginning math skills.
Math Arcade Games	$57.00	Orange Cherry Software	2nd–8th	48k	Students must make mathematical calculations and then use arcade-game dexterity to get full credit for their choices.
Math Blaster	$49.95	Davidson	1st–6th		Students learn basic math facts with four activities, including an action arcade game.
Math Blaster Plus!	$49.95	Davidson	1st–6th	128K	Five learning activities and a "Blasternaut" game teach students basic math facts and problem-solving skills.
Math Football: Decimals	$44.95	Gamco Industries		64K	Students advance down the field and score against the computer when decimal problems are answered correctly.
Math Football: Whole Numbers	$44.95	Gamco Industries		64K	Students advance down the field and score against the computer when whole-number problems are answered correctly.
Math in a Nutshell	$14.95	Learning Technologies	3rd–6th		A squirrel helps students learn to choose the correct combination of arithmetic operations.
Math Leap Frogs	$44.95	Gamco Industries		48K	Students guide frogs across the water to lily pads by answering arithmetic problems correctly.
Math Machine, The	$79.95	Scholastic	K–6th	48K	Students are rewarded with arcade games by answering problems correctly.
Math Man	$49.95	Scholastic	1st–6th	48K	Players move a construction worker up and down ladders while learning arithmetic.
Math Maze	$39.95	Scholastic	2nd–6th	48K	Students must avoid a hungry spider in a maze while solving math problems.
Math Rabbit	$39.95	The Learning Company	K–2nd	64K	Four games teach addition and subtraction of one- and two-digit numbers.
Mathworld Commander	$37.00	Orange Cherry Software	2nd–8th	48K	Students must defend the Mathworld Galaxy by correctly answering math problems.
Meteor Mission	$46.00	DLM			This fill-in-the-answer game helps teach fractions.
Meteor Multiplication	$46.00	DLM			Players must disintegrate meteors moving toward a star station while mastering basic multiplication problems.
Minus Mission	$46.00	DLM			Students must disintegrate large green blobs of slime with a robot while learning basic subtraction skills.
Money & Time Adventures of the Lollipop Dragon	$79.00	Society for Visual Education	K–3rd		Lollipop Dragon takes students on adventures while teaching time and counting money.
Multiplication Brigade	$44.95	Gamco Industries		48K	Students help the Bucket Brigade put out a fire by answering multiplication problems correctly.
Number Farm	$32.95	DLM			Six games help teach numerals, number words, numerical order, and counting skills.
Number Munchers	$55.00 (3½-inch disk: $59.00)	MECC	3rd–Adult	64K	Students guide the Muncher through grids looking for numbers that meet a certain criterion.
Path Tactics	$55.00	MECC	K–6th	48K	Students move robots along a racetrack by solving counting, addition, subtraction, multiplication, and division problems.
Prime Numbers	$35.00	MECC	7th–9th	48K	Prime numbers and prime factorization are discovered in this program that includes a factor-eating monster.
Puzzle Tanks	$65.00	Sunburst	3rd–Adult	48K	Students must fill and empty tanks to reach a target amount.
Soccer Math	$29.95	Scholastic	3rd–8th	48K	Two students compete against each other, scoring goals by answering addition, subtraction, and multiplication problems correctly.
Space Mission Problem Solving	$39.00	Orange Cherry Software	4th–7th	48K	Students journey to the Moon and to Mars while solving math problems.
Space Subtraction	$55.00 (3½-inch disk: $59.00)	MECC	1st–3rd	64K	Games and graphic sequences help teach simple subtraction to students.
Stickybear Math I	$39.95	Weekly Reader Family Software	K–4th		Students help Stickybear as they learn addition and subtraction.
Stickybear Numbers	$39.95	Weekly Reader Family Software	Preschool–K		Using groups of trucks, ducks, and planes, students learn counting and number recognition.
Subtraction Defenders	$44.95	Gamco Industries		48K	Students must defend castle walls from fireballs by answering subtraction problems correctly.
Word Problems in Math 1	$39.95	Scholastic	3rd–6th	64K	An interactive game helps teach the mechanics of word problems.
Word Problems in Math 2	$39.95	Scholastic	5th–8th	64K	This program includes a football game that requires correct answers to score.
Word Problems in Math 3	$39.95	Scholastic	3rd–Adult	64K	Students advance through a maze as they solve math word problems. aa

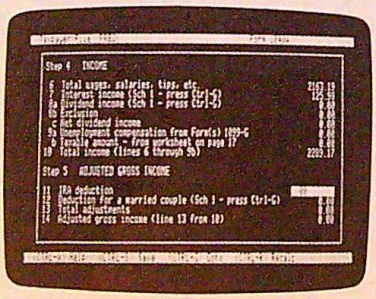
The Taxman Cometh

Dan McNeill

Dan McNeill doesn't like tax time any more than the rest of us, but he filled out reams of forms while putting together this report on some of the tax preparation programs for Apple II and Macintosh.

Death and taxes may be inevitable, but agonizing over stacks of tax forms doesn't have to be. Your Macintosh or Apple II computer, with the right software, can free you from the drudgery of tax time. A number of capable tax preparation programs exist for the Macintosh and Apple II—all you have to do is select the one best suited to your needs. Such software can't dispel that awful sense of financial hara-kiri, but it can certainly streamline the filing process and ease some of the anxiety.

A tax program should fit your situation. If your financial affairs are simple, you may find a low-end program like *Swiftax* just perfect. But if your demands are greater, you should consider carefully what forms you'll need and which programs provide those forms. The programs below included most of the schedules, but even the most complete lacked certain forms. (See the table "Schedules and Forms" to get a quick idea of which forms each program offers.)



Here we use SwiftTax *to fill out the all too familar 1040A tax form. The program's options are displayed at the bottom of the screen.*

If ease of use is important, you should also consider whether the program works alone or as a *template*, which must be used with a spreadsheet program. Unless you're quite familiar with the spreadsheet, templates can be more difficult to work with. Templates are also cumbersome to use, since they must conform to the spreadsheet grid and demand conventions such as typing a quotation mark before entering text.

The Tax Advantage *uses a series of descriptive menus, so the program is easy to follow and understand.*

Documentation can be very thin with tax software. If it's a simple program, that's not a problem. More sophisticated packages, however, suffer terribly when instructions are incomplete or unclear. Moreover, some manuals attempt to address users of several computers at once, marking off sections for Apple, Commodore, Atari, and so forth. This complicates the learning process, as you must pick your way through a mass of instructions to find the ones that apply to you.

Extras often matter with tax programs, and perhaps the best is tax planning. Advice on tax plan-

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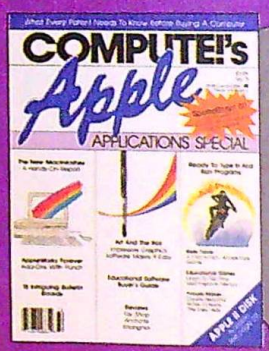

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ning can save you money, particularly now, with the tax law moving into a new transition stage every year. Planning data can appear in many places, such as a Help option or in the manual. Really copious documentation, like that of *Tax Preparer*, can constitute a veritable course in filling out returns. At least one program—*EZTax-PLAN* for the Macintosh—is a separate tax planner in itself.

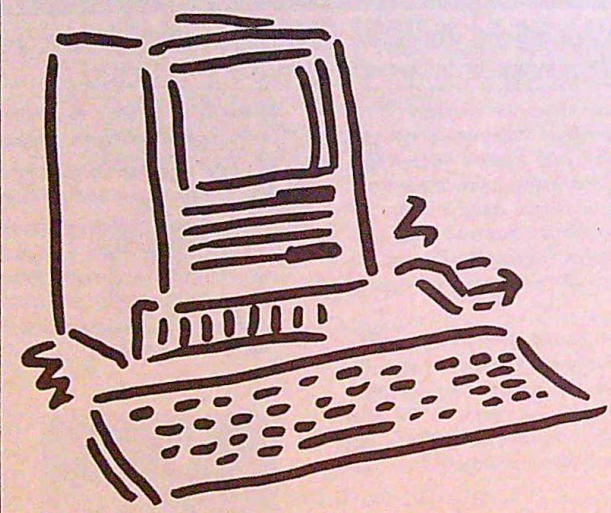
Another important extra is compatibility with financial management software. This feature can let you transfer information accumulated over the year directly into the tax program, saving you time and the irritation of copying figures into your machine.

A word about printing. The Internal Revenue Service (IRS) accepts printout of most schedules and forms on green-and-white awning-striped paper, but it is less accommodating with the crucial 1040 form. Most programs offer a way to print directly onto a preexisting 1040 form, and the IRS accepts such documents since, after all, they differ little from typed ones. However, aligning the form is usually tedious and frustrating. A better method is to print the data on a blank page, then place a clear plastic overlay of a 1040 atop it and run it through a copier. Of the programs below, only *MacInTax* prints a complete 1040—form, figures, and all—that the IRS accepts as is.

Tax software comes with at least two caveats. First, the IRS still considers you responsible for any errors that the program might generate, including mathematical mistakes. You should double-check your return to be sure it's correct. Second, a tax program cannot replace an accountant or a tax attorney. It cannot offer the best advice for your special circumstances, and it emphatically cannot interpret the tax laws for you. In some ways it best resembles a style checker, which picks up typos and generally improves one's writing.

Tax software normally reaches the market late, since the IRS doesn't finalize its guidelines till near the end of the calendar year. None of the programs I looked at were finished by deadline. Therefore, I examined either the 1986 program or a 1987 "early-bird special," for individuals who want to get a jump on their taxes. These weren't the completed 1987 programs, but they were close enough to indicate each program's thrust and character.

Macintosh



MacinTax

MacinTax is a slick, powerful program that mimics 1040 forms on the screen. It's the only program here which does so, and it gives you a pleasing sense of filling out the return directly. The software also prints out the entire form on an ImageWriter or LaserWriter (this is a true What-You-See-Is-What-You-Get tax program).

When you open *MacinTax*, it displays information about which 1040 you can file. You select one of three forms from the menu bar, and see the 1040 on the screen. You can then select one of a variety of worksheets, such as W-2 or short-term capital gains, and fill in the information. These worksheets are mostly for your own use, but the amounts in them automatically appear in the 1040 form. You can sidestep them, of course, and start filling in the form directly, entering name, address, and so forth, using the Tab key to jump conveniently from one space to the next. If you want to leap over several lines, you simply move the cursor to the space you want and click. Everything proceeds smoothly, and the program calculates quickly in the background while you're entering items.

MacinTax displays data in various formats, such as Dollars and Cents or Dollars Only, the latter automatically rounding the figure off. It also has a Tabs Down feature, which moves the cursor down when you click Tab. In addition, it offers itemization windows, where you can total up the amounts leading to a particular figure, and then use the Link and Unlink commands to attach them to the appropriate line.

The program can import data from *MacMoney* and the best-selling *Dollars & Sense*, which in turn is compatible with other Monogram products. *MacinTax* can also import data from other applications which generate text files, as long as they separate the data fields by Tabs and the data records by Returns. Finally, *MacinTax* can shift information from one year up to the next, or from one kind of 1040 form to another, using its Converter module.

MacinTax may be the easiest of all the programs to use, partly because it shows you exactly what the final will look like. It also has many Command-key shortcuts and offers online Help, a series of instruction windows for each form or schedule.

MacinTax lacks certain forms, notably 3468 (Investment Credit, now mostly gutted) and 3800 (Business Credits). It does not of-

fer tax planning. Its worst feature is its documentation which, though clear, is spare, and stands out against this otherwise excellent program.

SoftView, 4820 Adohr Ln., Suite F, Camarillo, CA, 93010. Phone: 805-388-2626. Requires: Macintosh 128K, 512K, Plus, or SE.

EZTax-PREP

EZTax-PREP is more complete than *MacinTax*, but it unfortunately runs as a template on *Excel* or *Multiplan*. The *Excel* template differs from that for *Multiplan*, and you must specify your spreadsheet when ordering.

Because it works as a template, *EZTax-PREP* is more awkward than most programs. It moves you about in the rigid spreadsheet manner, rather than from one item to another via the Tab key. The add-on nature of this program has one advantage, however: With *Excel*, you can use the Chart feature to create an assortment of graphs.

EZTax-PREP is complete in several ways. It automatically carries information across forms, thus avoiding multiple entry of the same data. It has Form 3800, absent in *MacinTax*, but it too lacks the 3468. EZWare, however, has anticipated a number of other needs and attempted to fill them. For instance, *EZTax-PREP* comes with Audit Alert, which informs you if your deductions significantly exceed the norm on returns with the same adjusted gross income. (However, as the manual notes, a high deduction alone may not trigger an audit, and the IRS considers other variables in its audit decision.)

EZTax-PREP comes with a client letter and a general purpose Auxiliary Schedule. In addition, it has an Xcheck feature, which automatically checks the consistency of *EZTax-PREP* documents. EZWare also sells a Macintosh tax planning program called *EZTax-PLAN*. This software comes in two forms: the Personal Edition and the Business Edition.

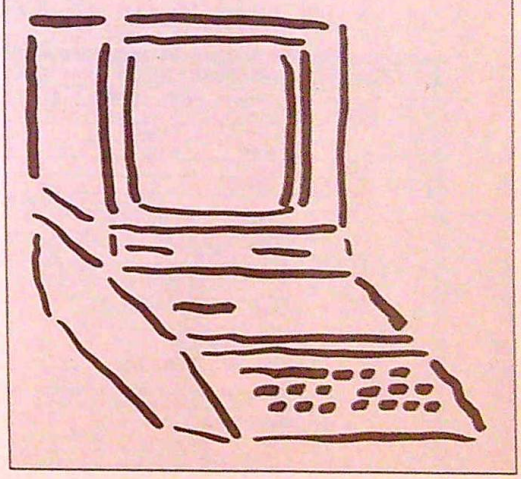
EZTaxPREP is well stocked for printing. It comes with a set of 1040 transparencies, so you can print on blank paper and photocopy the transparency atop the printout. It also offers 1040 forms on continuous paper.

The program comes with a good manual, which includes a tutorial and specific instructions on each schedule and form. However, many basic sections, such as those on printing, differ depending on whether one uses *Excel* or *Multiplan*, something which causes minor confusion.

EZTax-PREP lets you compute taxes several years in advance using the new tax rates, and it also lets you compare various alternatives for a single year. It copies data from *EZTax-PREP*, contains Audit Alert, and in the *Excel* version, offers charts comparing projected deductions to standard ones. Since the tax laws are in constant flux, the company provides one free update and others at a nominal charge.

EZTax-PREP, EZWare Corp., P.O. Box 620, 29 Bala Ave., Suite 206, Bala Cynwyd, PA 19004. Phone: 215-667-4064. Requires: Macintosh 512K, Plus, or SE; Excel *or* Multiplan *spreadsheet.*

Apple II



Tax Preparer

Tax Preparer is among the most sophisticated of all the tax programs. It's been around since 1979 and has accumulated a great deal of in-depth tax knowledge. This year it boasts several new enhancements. It now calculates in machine language rather than BASIC, speeding the process. It also has split screens and an assortment of dialog boxes to move quickly through the numerous forms.

You begin with a main menu offering four choices: setting up a storage disk, preparing 1040 returns, printing official returns, and changing the settings. The second option, preparing the 1040, contains the meat of the program. It lets you input data, does calculations, and prints rough drafts.

Among its other features, *Tax Preparer* itemizes lists, contains tax law past 1990, and automatically copies entries from prior years. It has more forms than any other program listed here. It even has a Road Map depicting routes from certain lines to the associated forms behind them.

Tax Preparer has a variety of special function keys that provide quick access to various program functions. There's even a Help option to help you learn each keypress. *Tax Preparer* has cover and billing letters for tax preparation professionals, and prints IRS approved forms for all but the 1040.

Finally, *Tax Preparer* has by far the best documentation of any of these programs. It's massive, readable, and highly informative—not only about the software but about taxation itself. It takes you detail by detail through the schedules and forms, explaining each, offering suggestions for profit, flagging special cautions, and noting changes in the future tax law. It also has a glossary and an index. As an example of its care and thoroughness, it provides not only a tutorial, but a quick guide for prior users and a second quick guide for those whom, it predicts, will ignore the tutorial.

This is a first-class item.

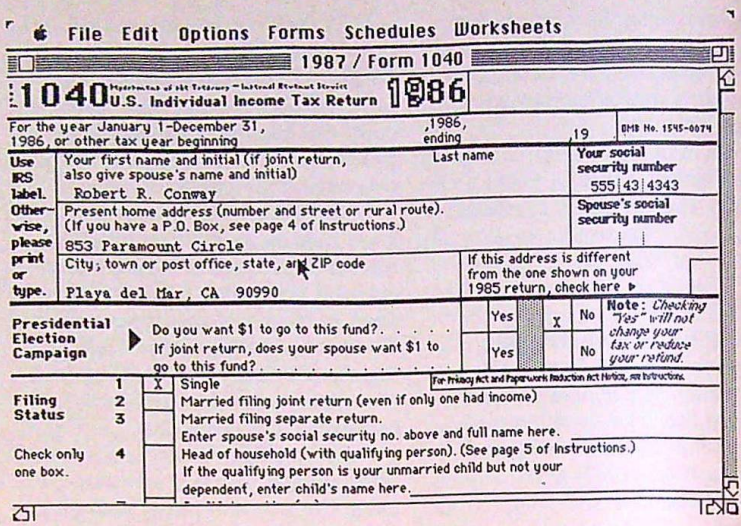
Tax Preparer, HowardSoft, P.O. Box 8432, La Jolla, CA 92038. Phone: 619-454-0121. Requirements: Apple II-series computer with 64K minimum.

EZTax-PREP

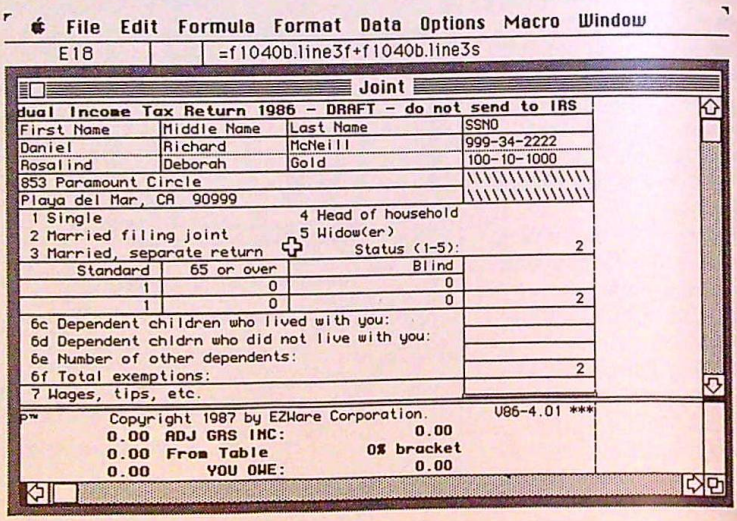
The *EZTax-PREP* program for the Apple resembles its Macintosh cousin in many ways. It is quite complete, though it lacks the 3468 Form. It is a template, and works with *Multiplan* only. Here, the use of a template is doubly unfortunate, for, while *Excel* is the acknowledged king of the spreadsheets, *Multiplan* has lost much ground to *AppleWorks*.

Like the Macintosh version, this package comes with greenbar paper, transparent overlays, and continous 1040 forms. It has Audit Alert, the Auxiliary Schedule, and the client letter.

EZTax-PREP, EZWare Corp., P.O. Box 620, 29 Bala Ave., Suite 206, Bala Cynwyd, PA 19004. Phone: 215-667-4064. Requirements: Apple II–series computer with 64K minimum and Multiplan *spreadsheet.*



With MacinTax, *the screen looks just like a real Form 1040. To enter data, simply click on the desired line and type away. When you're done, the program prints out the completed Form.*



The Macintosh version of EZTax-PREP *works as a template for the* Excel *or* Multiplan *spreadsheets. Here we see the* Excel *version being put to use.*

The Tax Advantage

The Tax Advantage is a low-end program for relatively simple needs, but it does have a few nice features which distinguish it from the competition. It is completely menu-driven, so you work your way through by selecting various menu options.

It resembles the other simple programs in its limited number of forms. Aside from the 1040, it has only the 2106 (Employee Business Expenses), 2441 (Credit for Child/Dependent Care), 4562 (Depreciation and Amortization), and 6251 (Alternative Minimum Tax Computation). It also lacks Schedule R, for Elderly and Disabled Income.

But *The Tax Advantage* has some special qualities. Like *MacinTax*, for instance, it lets you compile itemization lists for each line so you can enter your financial records throughout the year and have them ready at tax time.

In addition, you can temporarily override one line's figure with another, to determine the various consequences of tax decisions. If, for instance, you were contemplating a last-minute charitable deduction, you could enter the figure and see how it would alter your taxes.

Moreover, *The Tax Advantage* is compatible with *The Home Accountant*, allowing you to transfer figures quickly into the correct tax category.

The manual initially addresses users with different types of computers, giving a medley of instructions for setup. The rest of the manual is the same for all computers, however, and the documentation reads smoothly from there on.

The Tax Advantage, Double Eagle Software, Inc., 2210 Wilshire Blvd., Suite 875, Santa Monica, CA 90403. Phone: 213-212-6611. Requirements: Apple II–series computer with 48K minimum.

Swiftax

Swiftax is another simple, relatively inexpensive program. It has pull-down menus, and though it doesn't use a mouse, it is easy to work with. You move through the menus with arrow keys and select menu items with the Return key. The program also has special control–key combinations, with which you can call up menus and execute commands.

Swiftax has only four forms—the 2106, 2441, 4562, and 6251—though it does have Schedule R. The program takes little time to learn. The documentation is slen-

Schedules And Forms

	MacinTax	*EZTax-PREP*	*Tax Preparer*	*EZTax-PREP*	*The Tax Advantage*	*Swiftax*	*Tax Command Professional*
Schedules							
A	•	•	•	•	•	•	•
B	•	•	•	•	•	•	•
C	•	•	•	•	•	•	•
D	•	•	•	•	•	•	•
E	•	•	•	•	•	•	•
F	•	•	•	•	•	•	•
R	•	•	•	•		•	•
SE	•	•	•	•	•	•	•
Forms							
2106	•	•	•	•	•	•	•
2119	•	•	•	•			•
2210	•	•	•	•			
2441	•	•	•	•	•	•	•
3468			•				
3800		•	•	•			
3903	•	•	•	•			•
4562	•	•	•	•	•	•	
4684	•	•	•	•			
4797	•	•	•	•			
4972		•		•			
6251	•	•	•	•	•		
6252	•	•	•	•			
8582			•				
8598			•				
8615			•				

Electronic Tax Filing

Many people use tax preparation software to help with the annual chore of filing their federal income tax returns with the Internal Revenue Service. In most cases, you enter the tax information into your computer, which calculates everything and prints out the completed forms. Then you mail the forms to your regional tax office, where an IRS employee feeds the same information into the government's computer for processing.

Wouldn't it be simpler to let your computer talk directly with the IRS's, eliminating all the paperwork? That's just what the IRS is trying to do. Electronic filing of 1987 tax returns is being tested in 16 districts across the United States: Albany, NY; Birmingham, AL; Buffalo, NY; Cincinnatti, OH; Dallas, TX; Greensboro, NC; Indianapolis, IN; Louisville, KY; Milwaukee, WI; Omaha, NB; Phoenix, AZ; Richmond, VA; Sacremento, CA; San Jose, CA; Salt Lake City, UT; Seattle, WA.

In its second year of testing, the program is designed for commercial tax preparers and *not* for the individual filer, at least not yet. To participte, commercial preparers must have filed an application with the IRS by September 15 of last year for filing 1987 returns. (Preparers interested in the program can call their local IRS office to have their names placed on a list for next year's filing.)

Last fall the IRS sent a test packet of tax returns from its Cincinnatti service center and asked preparers to complete them as if they were filing actual tax returns. The completed test forms were sent by computer via modem to the IRS for verification that the preparer's system and the IRS's were compatible.

If all went well, preparers got a letter from the IRS notifying them that the test filing was successful and they were ready to start filing "live returns."

The IRS does not prescribe or recommend specific tax programs, but 150 software firms have expressed interest in designing packages that process tax information in a format suitable for electronic filing. By the end of 1987, approximately 4000 commercial tax preparers had signed up to participate in the electronic filing program.

—Tom Netsel

der, but it doesn't really need to be any larger. Best of all, the manual is clear, graphically attractive, and addressed solely to Apple users.

Swiftax offers online help in five areas, but unlike most Help options, it doesn't assist you in using the program, but rather provides tax information. For instance, it offers definitions of key terms and provides an outlook for coming tax changes. *Swiftax* also comes with *Sylvia Porter's 1987 Income Tax Guide*, a useful adjunct, and Ms. Porter has written a brief introduction to the manual.

Swiftax, Timeworks, Inc., 444 Lake Cook Rd., Deerfield, IL 60015. Phone: 312-948-9200. Requirements: Apple II–series computer with 64K minimum.

Tax Command Professional

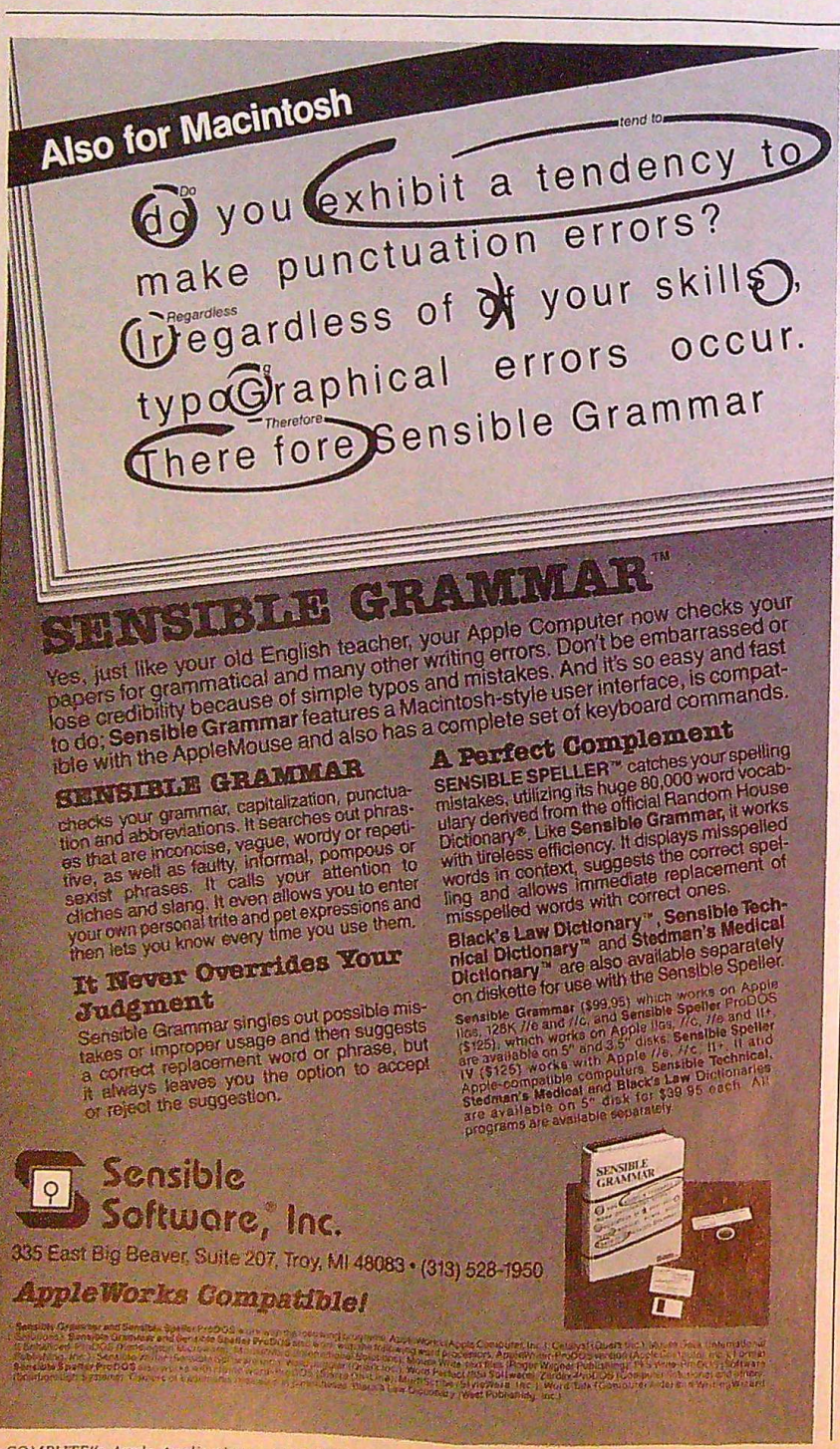
Tax Command Professional is a simple program that's easy to use. It boots up with a spoken welcome and a bit of graphics flash, then it leads you into its basic menu structure. This structure is a snap to comprehend and follow, since it almost always displays the available commands online. The screen does not resemble the 1040 form, and the manual suggests that you keep one nearby to better grasp the program.

When you're ready to print, you enter personal information, such as your name and social security number. This software, like the others, prints directly onto a 1040 form. The manual is very scanty: 33 pages, in a booklet that fits into your back pocket.

Tax Command Professional, Practical Programs, Inc., P.O. Box 93104, Milwaukee, WI 53203. Phone: 414-272-7227. Requirements: Apple II–series computer with 64K minimum.

Tax preparation can be a tedious chore at best, but with the help of your computer, you may be able to save yourself both time and (most importantly) money. Remember, however, that the type of tax program you buy should depend mainly on your *current* needs. Don't buy a program for its great expanse of options if all you're filing this year is a 1040-EZ. And even if you think your tax status is going to change in future years, keep in mind that tax programs are dated items, requiring upgrades with every flux in tax laws.

Dan McNeill is a freelance writer who specializes in computers. His work regularly appears in a variety of Macintosh and Apple-specific publications. Dan's most recent book is COMPUTE!'S Quick & Easy Guide to Desktop Publishing *(COMPUTE! Books).*



AppleWorks For Everyone

Tax Time

Christopher Van Buren

Tax time nears, and with it, an opportunity to put AppleWorks *to work. This month, Van Buren presents a ready-to-enter spreadsheet template for the 1040 form and offers information about* 1040Works, *a commercial package of templates for almost every tax form imaginable.*

This year, you won't have to worry about getting your taxes done. This year, you and your Apple II can take on the annual task by building a simple tax form with *AppleWorks*. The form will be able to store the data that goes onto the official 1040 form. It will also perform certain calculations, so you don't have to.

What the template won't do is collect and itemize your data. It won't show you where you've stored your receipts, check stubs, and statements. That part is still up to you. Other templates published in COMPUTE!'s Apple Applications can be used for tracking expenses for tax purposes and for Schedule A itemization (see "*AppleWorks* for Everyone," December 1987).

Formatting The Form

Let's begin the worksheet with the Income section of the 1040 form (the previous sections can be filled out by hand). The only tricky part of the worksheet is setting up the columns so that the numbers and titles are aligned properly. Figure 1 shows what you want the worksheet to look like. Without adjusting any column widths, enter the form line number in column C. You'll have to begin each entry by typing a quotation mark (") so you can space out to the edge of the column before entering the number. Enter titles beginning at column D.

Notice that column I contains most of the numbers in the form. You can format this column to show all numbers with two decimal places automatically. Do this by entering the Open Apple–L command; choosing the *Columns* option, the *Valueformat* option, and the *Fixed* option; and then indicating 2 decimal places. Every so often, a number cell will appear in a column other than I, such as on line 9a. You'll have to format these cells individually.

If your spreadsheet looks like Figure 1, you're ready to proceed with the rest of the 1040 form. Use the row and column indicators shown in Figure 2 to

Figure 1

Start the spreadsheet using this model.

File: TAX FORM REVIEW/ADD/CHANGE Escape: Main Menu

	B	C	D	E	F	G	H	I
22	INCOME	7	Wages, salaries, tips, etc. (attach w-2)					0.00
23		8	Interest income					0.00
24		9a	Dividends	0.00	b Exclusion		0.00	
25			c Subtract line 9b from 9a					0.00
26		10	Taxable refunds of state and local					0.00
27		11	Alimony received					0.00
28		12	Business income or loss					0.00
29		13	Capital Gain or loss					0.00
30		14	40% of capital gain distributions not on 13					0.00
31		15	Other gains					0.00
32		16	Fully taxable pensions, IRA, and annuities					0.00
33		17a	Other pensions and annuities				0.00	
34			b Taxable amount from worksheet					0.00
35		18	Rents, royalties, partnerships, etc.					0.00
36		19	Farm income					0.00
37		20a	Unemployment insurance				0.00	
38			b Taxable amount from page 10					0.00
39		21a	Social Security benefits				0.00	
40			b Taxable amount		tax exmpt		0.00	0.00
41		22	Other income					
42								0.00
43		23	Add the amounts 7 - 22					0.00
44								

align your form. The Open Apple–L command is again used to format the number cells.

Entering The Formulas

The formulas in this spreadsheet are fairly simple. The first one appears in cell I9 and adds the exemptions claimed in the six cells on lines 6a and 6b.

+d9+d10+e9+e10+f9+f10

The next formula goes into cell I25.

I25: +E24−H24

This simply subtracts the form's item 9b from 9a.

Here are the rest of the formulas to enter into the worksheet.

I43: @SUM(I22 . . . I42)
I53: @SUM(I45 . . . I52)
I57: @IF(@AND((I53−I43)<11000,I13>0),@ERROR,I53−I43
I59: +I57
I65: @IF(I60>0,0,H63+H64)
I66: (I57−I60)-I65
I67: 1040*I20
I68: @IF(I66−I67<0,0,I66−I67)
I72: +I69+I70
I77: @SUM(H74 . . . H76)
I78: @IF(I72−I77<0,0,I72−I77)
I82: +I80+I81
I83: @IF(I78−I82<0,0,I78−I82)
I90: @SUM(I85 . . . I89)
I100: @SUM(H92 . . . H99)
I102: @IF(I100>I90,I100−I90,0)
I106: @IF(I100<I90,I90−I100,0)

The formula in cell I57 works with version 2.0 of *AppleWorks* only. If you don't have version 2.0, enter: I53−I43. The 2.0 version will produce an ERROR message if your adjusted gross income is less than 11,000 and you have a child living with you. This indicates that you should see instructions which accompany the tax forms. Other formulas using the IF statements check that amounts are not less than 0 before performing the calculations. Cell I65 makes sure that you haven't entered anything in line item 34a before it adds the amounts in 34b and 34c. This is because you should have only one of these categories filled out for your return.

All other cells must be filled in manually. As you fill in the blanks in columns H and I, the calculations change to reflect the new information. When you're finished, transfer the figures to your tax form.

Figure 2

```
File: TAX FORM                  REVIEW/ADD/CHANGE                Escape: Main Menu
=======B=======C=======D=======E=======F=======G=======H=======I===
 1|
 2|1040 U.S. INDIVIDUAL TAX RETURN  1987
 3|
 4|John R. Doe                                  ss#      123-45-6789
 5|2398 First Street                            spouse#
 6|Los Angeles, CA  91001
 7|
 8|
 9|EXEMPTIONS      6a          1         1         0
10|                  b          1         1         0                          4
11|
12|                  c Children who lived with you:
13|                                                                           0
14|                  d Children who did not live with you:
15|                                                                           0
16|                  e Other dependents:
17|
18|
19|                                                                           0
20|                  f Total exemptions                                       4
21|-----------------------------------------------------------------------------
22|INCOME          7  Wages, salaries, tips, etc. (attach w-2)              0.00
23|                 8  Interest income                                       0.00
24|                 9a Dividends      0.00        b Exclusion      0.00
25|                  c Subtract line 9b from 9a                              0.00
26|                10  Taxable refunds of state and local                    0.00
27|                11  Alimony received                                      0.00
28|                12  Business Income or loss                               0.00
29|                13  Capital Gain or loss                                  0.00
30|                14  40% of capital gain distributions not on 13           0.00
31|                15  Other gains                                           0.00
32|                16  Fully taxable pensions, IRA, and annuities            0.00
33|                17a Other pensions and annuities                 0.00
34|                  b Taxable amount from worksheet                         0.00
35|                18  Rents, royalties, partnerships, etc.                  0.00
36|                19  Farm income                                           0.00
37|                20a Unemployment insurance                       0.00
38|                  b Taxable amount from page 10                           0.00
39|                21a Social Security benefits                     0.00
40|                  b Taxable amount              tax exmpt      0.00      0.00
41|                22  Other income
42|                                                                          0.00
43|                23  Add the amounts 7 - 22                                0.00
44|-----------------------------------------------------------------------------
45|ADJUSTMENTS     24  Moving expenses                                       0.00
46|to INCOME       25  Employee business expenses                            0.00
47|                26  IRA deduction                                         0.00
48|                27  Keogh retirement plan SEP deduction                   0.00
49|                28  Penalty on early withdrawal                           0.00
50|                29  Alimony paid
51|                      Paid to:                                            0.00
52|                30  Deduction for a married couple / both work            0.00
53|                31  Total adjustments                                     0.00
54|-----------------------------------------------------------------------------
55|ADJUSTED
56|GROSS
57|INCOME          32  Adjusted gross income                                 0.00
```

Form continued next page.

File: TAX FORM REVIEW/ADD/CHANGE Escape: Main Menu

59	TAX	33	Amount from line 32		0.00
60	COMPUTATION	34a	Amount from schedule A (if you itemize)		0.00
61			Check box if dependent		
62					
63		b	Charitable contrib. (not itemized)	0.00	
64		c	Non cach contributions	0.00	
65		d	Total contributions		0.00
66		35	Adjusted Gross Income from line 33		0.00
67		36	Adjusted Exemptions		4160.00
68		37	Taxable Income		0.00
69		38	Tax on amount in line 37 (from table)		0.00
70		39	Additional Taxes (from 4970, 4972,		
71			or 5544)		0.00
72		40	Total		0.00
73					
74	CREDITS	41	Credit for child care expenses	0.00	
75		42	Credit for elderly or disabled	0.00	
76		43	Partial credit for political contrib	0.00	
77		44	Add lines 41 thru 43		0.00
78		45	Subtract line 44 from 40 (not less than zero)		0.00
79		46	Foreign tax credit	0.00	
80		47	General business credit (form 6765,		
81			3468, 3800, 5884, or 6478)	0.00	
82		48	Total from 46 & 47		0.00
83		49	Subtract 48 from 45 (not less than zero)		0.00
84					
85	OTHER	50	Self-employment tax		0.00
86	TAXES	51	Alternative minimum tax		0.00
87		52	Recapture of investment credit		0.00
88		53	Social Security tax on tip income		0.00
89		54	Tax on an IRA		0.00
90		55	Total "other" tax		0.00
91					
92	PAYMENTS	56	Federal income tax withheld	0.00	
93		57	Tax payments and credit from 1986	0.00	
94		58	Earned income credit	0.00	
95		59	Amount paid from form 4868	0.00	
96		60	Excess Social Security and RRTA		
97			tax withheld (two or more employers	0.00	
98		61	Credit for Fed tax on gasoline	0.00	
99		62	Regulated investment company credit	0.00	
100		63	Total payments		0.00
101					
102	REFUND OR	64	AMOUNT OVERPAID (if any)		0.00
103	AMOUNT	65	Amount of line 64 to be refunded		0.00
104	YOU OWE	66	Amount of line 64 to be applied		0.00
105			to 1988 estimated tax	0.00	
106		67	Amount you owe (if any)		0.00
107					

This figure shows the entire tax worksheet. Use it to enter the labels into your spreadsheet by following the row and column indicators.

Chris Van Buren is editor and publisher of the AppleWorks Journal *and author of several books on* AppleWorks.

COMPUTE! Publications cannot be held responsible for your tax return. Use this template at your own discretion.

1040Works

Personal Financial Services publishes an *AppleWorks* tax template called *1040Works*. This template is a predesigned spreadsheet file containing all the necessary calculations and tables for tax preparation. It's significantly more powerful than the spreadsheet described in the article because it does more of the work for you and contains almost every tax form and schedule you can imagine.

The template comes on two disks full of tax forms. Included are Schedules A, B, C, D, E, F, G, SE, R, and W. It also contains forms 1040, 2441, 5694, 6251, 2106, 2119, 3909, 4562, 4972, and 5694. The forms don't automatically link information between them, but you can easily transfer totals from one form to the next, once the first is completed.

1040Works does not try to tell you what forms to use or how to organize your taxes. But if you know what to do with your financial records at the end of the year and how to file your taxes, *1040Works* will provide all the tools necessary to complete your return yourself.

1040Works does most of the table lookups for you. You don't have to go back and forth between tax tables and your tax form to calculate the taxable income. Many of the forms that you can print directly with *1040Works* are submittable to the IRS, although the 1040 form itself is not.

The manual is not an especially well-produced document, but it is complete. It includes special tips for many of the forms and instructions on transferring data from other programs. A tutorial file comes on one of the disks, as does a set of macro files for use with the top-selling macro products for *AppleWorks*.

If you're in the tax-preparation business or make extra money on the side by preparing a few tax returns, *1040Works* is ideal software for your Apple II. If you have a complicated tax return, I really can't recommend doing your own taxes (unless you're a tax preparer). But if you want to give it a go, I'd have to recommend using *1040Works*. aa

You've Got To Love The Games First

A Conversation With Chris Crawford

Keith Ferrell, Features Editor

Chris Crawford's reputation as an innovative game designer extends back to the early days of microcomputers and video games.

Crawford began designing games—particularly war games—when he was a teenager. His first commercial game, Tanktics *(1978) was also one of the first computer war games for the consumer market. A year after its release, he went to work for Atari, eventually heading that company's Games Research Group. Among the other early Chris Crawford games are* Energy Czar, Scram, *and* Eastern Front.

As a freelance designer, Crawford has remained committed to innovation and boldness in design. Balance of Power *(Mindscape) introduced a geopolitical level to gaming that the industry had not seen before. Crawford's new game,* Trust and Betrayal: The Legacy of Siboot *again breaks ground, this time through the use of artificial personality and language. It is a game of communication and understanding as much as of strategy.*

Chris Crawford remains committed to strong opinions, as well.

Apple App: Trust and Betrayal, *with its emphasis upon character and communication, is quite different from most computer games. What prompted you to develop the game?*

Crawford: I've always felt that, until computer games get characters in them, computer games will remain insipid. So I set out to do a game that had characters—characters with whom you could interact in a meaningful and significant way. The whole thrust of *Trust and Betrayal* is to have an interaction with some interesting characters.

Apple App: *The game also has a lot to say about the nature of communication itself.*

Crawford: There is that, although that was a lot of work on my part. What I was driving at was interaction, and interaction of course presupposes. I put far more effort into the language than into the artificial personalities. There was about a month of very intense labor getting the artificial personality system working. But the language—I struggled with that language from day one. Until right up to the end, I was making changes in the language.

Apple App: *How much time did you spend on the game altogether?*

Crawford: Thirteen months of full-time effort, plus another month of part-time effort.

Apple App: *What prompted you to choose the Macintosh for* Trust and Betrayal*?*

Crawford: It's an excellent development environment. The Mac I have right now has a 68020 running at 16 MhZ, with four megabytes of 32-bit RAM—this thing really flies. I use the Macintosh Programmer's Workshop which, is an excellent programmer's environment.

As a target machine, it also excels. It's clean, it's simple, it has a lot of power and a lot of nice routines built into it. It has good resolution, a lot of memory, a lot speed.

Finally, the target audience is a good audience for me. I write for adults. Only the IBM PC approaches the Macintosh in terms of the concentration of the types of people I'm trying to reach.

Apple App: *Do you see* Trust and Betrayal *being ported to machines such as the PC?*

Crawford: I certainly hope so, but that's a decision Mindscape will make.

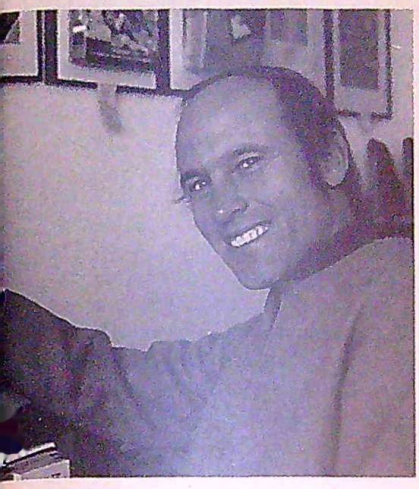
Apple App: *How well do you think you met the goals you set for yourself with this new game?*

Crawford: It's funny. I am immensely proud of what I have achieved, and yet I feel some disappointment that it didn't turn out better. It's difficult to explain the extremity of my contradictory feelings. I look at this game and say that I have never ever in my life done anything as fine, as energetic, and creative as this. I still have to slap my cheeks and say, "How did I pull this off?"

At the same time, I wish the characters could be brighter, that they could show up more strongly.

Apple App: *What sort of response do you hope* Trust and Betrayal *will engender?*

Crawford: I have high hopes that the game will change the industry. I very much hope that it sells a million copies—not so much because it will generate a lot of royalties for me, although that would be very nice, but be-



cause if it sells a lot, the industry will sit up and take notice and stop grinding out this endless succession of shoot-em-ups and hack-and-slash, and the same old stuff that you see over and over.

Apple App: *Let's talk about that. What do you see as the entertainment software industry's biggest flaw?*

Crawford: Speaking very broadly, the greatest problem is creative stagnation, the lack of emphasis on creativity. And this runs throughout the industry. The problem is caused by publishers, designers, and customers. Nobody seems to care much about innovation and real creativity.

We do so many clones! We're on *Ultima V* now. *Carmen San Diego*—I think they're working on the third one. Which *Bard's Tale* are we on.? Infocom—when I look at the entire Infocom product line, I'm reminded of the statement that Vivaldi did not write 465 concerti, he wrote one concerto 465 times.

We seem to do so many sequels and variations. It is appalling how little true innovation we see in this industry. I was in an excellent software store yesterday. There was an excellent game selection, but everything was either something I had, or something I had seen before. There wasn't a single really interesting game on the shelves.

Apple App: *What games, then, do you play?*

Crawford: I actually don't play very much. *Strategic Conquest* is a game that I enjoy a lot. I enjoyed *Shanghai* for a while. I've got *Falcon*, a flight simulator for the Macintosh. *Wizardry, Dark Castle*—I purchase all of the important games that come out.

Frequently, though, I play a game for three or four hours to get a feel for it; then I lose interest. I've seen them all before.

Apple App: *Do you have any favorite non-Chris-Crawford games?*

Crawford: I've long believed that *M.U.L.E.* by Dan Bunten is one of the finest computer games ever designed. And I *still* feel that it is one of the finest games ever designed. That game's four years old by now—it's held up fairly well.

Apple App: *You've designed quite a few strategy games. We've just seen your* Patton vs. Rommel *come out for the PC. Do you see yourself doing more war and strategy games of this sort?*

Crawford: Yes and no. There are some brilliant ideas in *Patton vs. Rommel*, most of them buried deep in the artificial intelligence. Unfortunately, those really don't shine as brightly as I'd like.

Apple App: *What did you set out to accomplish?*

Crawford: I had just finished *Balance of Power*. Very bold, very innovative design. At the time, the whole world was saying, "Boy, that was a stupid thing you did! That will never sell—you're going to lose your shirt! You've wasted nearly a year-and-a-half.

Electronic Arts came to me and said that while it's nice to do artistic projects, it's also nice to eat. They asked me to do one of the most beautiful war games that had ever been done.

We set out to do an existing concept really beautifully. It's basically the Electronic Arts product line: Take an existing genre and do the best possible version of it. I still don't think that advances the industry very much.

It's more important that we attempt bold, new ideas, rather than take old ideas and do them better.

Apple App: *Your critics' predictions were wrong.* Balance of Power *turned out to be a big hit.*

Crawford: It has generated quite a response, and the responses come on many levels. The most common response I get is that it is too difficult to win the game, that the game is too difficult to understand, that it's too hard to keep track of all that's going on, that it's very frustrating.

A game has to be adjusted to the audience, and I misread my audience. I misread the extent to which they keep up with the news.

Apple App: *And yet the game was a success in the marketplace.*

Crawford: It's funny. Even though I misread my audience, they seem to like the game. They must love punishment. Far and away the most common request, if I ever do an update of *Balance of Power*, they want to see a multipolar version, in which all of the countries in the game make their own decisions, have their own policies, do their own things, and their actions affect the world. In a bipolar world, such as *Balance of Power*, there are two superpowers, and the other countries revolve around their actions.

I stripped out multipolarity because it makes the game more complex. Here are people saying, "This game is too complex—please, give me *more* complexity!"

Apple App: Balance of Power *is a very political game. What political criticism have you received?*

Crawford: Yes, and I'm pleased to say that it seems to come from all sides, fairly evenly. *Balance of Power* was roasted in a left-wing journal. On the other hand, it has also been attacked by people from the far right, who seem upset that you can play the game as either the United States or the Soviet Union.

Some people object to what they see as a moral equivalence—that you can play the Soviet side the same way as you play the United States.

In fact, the game doesn't really have any moral component at all. It simply doesn't address the moral issues. It's a game about geopolitics. There is, I guess, an equivalence of sorts—I don't talk about the moral value of the U.S.A., and I don't talk about the

moral value of the Soviet Union.

Apple App: *What areas of the entertainment software industry do you see as most in need of improvement?*

Crawford: The first thing we need to do is stop writing exclusively for fourteen-year-olds. The vast majority of games being published are designed for fourteen-year-olds. There's nothing wrong with that. But there are a lot of twenty-year-olds, and thirty-year-olds, and forty-year-olds. There's no reason why we can't be writing for those other people as well.

Apple App: *Not to mention the fact that today's fourteen-year-old grows up.*

Crawford: Yeah. And what happens is, he grows out of the game market just as his buying power explodes. And he loses interest in what we're selling.

Apple App: *What else?*

Crawford: One thing we've got to start doing is putting characters into games. One reason we write for younger players is that it's the best we can do right now. If you want to write for a thirty-year-old, you'd better have some substance there. "Bang-Bang, you're dead" will impress a child—it won't impress an adult.

Apple App: *You feel you've incorporated real characters in the new game?*

Crawford: It's funny. I've been talking about the importance of characters for a long time. But there was always this beautiful counter-argument: "Show me, Chris. Talk is cheap. Can you actually put real characters into a real commercial product?"

And, by gum, I did it!

We've also got to develop better ways of talking with characters and interacting with them, but I think that can be done.

Apple App: *What sorts of things can you do with characters?*

Crawford: Once we start getting characters, a whole world of options opens up to us. Most of art, most of literature and the cinema, *all* of the theater is about people. If your games are about things, instead of people, they're never going to get anywhere.

Apple App: *Will the transition to character-oriented games happen quickly?*

Crawford: This is going to take decades. It's going to be a long, long time before we get really good, rich characterization in our games.

Apple App: *What will it take?*

Crawford: We already have the hardware; we don't have to wait for vastly superior hardware. A Macintosh with half a megabyte of RAM is quite capable of supporting what we need to do. The problems we have all reside in our own limitations.

Apple App: *Are those industry limitations?*

Crawford: Yes, and to some extent the customers, who do not demand higher quality, who seem quite content to shell out their money for the same old crap over and over.

Apple App: *What would you do to change this situation?*

Crawford: Our fault here is that we're not giving them reasonable choice. If the customer looked at the retail shelf and saw four childish shoot-em-ups, and four good, rich, character/interpersonal games, then he could have a real basis for choice.

Right now the consumer has no choices to make. It's either buy the childish shoot-em-ups or get out of the community—a love it or leave it approach.

Apple App: *What's next? What projects are you working on now?*

Crawford: I'm working on a number of proposals right now. One of the lessons I learned from *Trust and Betrayal* is that I should think through my projects a little more carefully before I plunge into them.

With *Trust and Betrayal*, I wrote a long, complicated proposal, and the only thing shared with the finished game is that there's a strange language and you're talking to artificial characters. Otherwise, it's a completely different game.

Apple App: *Did that experience alter the way you present games to publishers?*

Crawford: Now I'm preparing much more thorough proposals that go into much greater detail on the user interface issues, screen layouts, game mechanics, and so forth.

It's a slow process. Thinking is the most important part of the game design process, and yet you can't just sit down and think for eight hours a day. So every day I work for a few hours on one of the proposals, and then do some reading or writing, deal with odds and ends of business, maybe some minor programming.

I get frustrated, but it's essential that I take time.

Apple App: *How should someone who wants to write computer games go about getting started? What sort of preparation did you make for your career?*

Crawford: I have no training whatever in computer science. My academic training is in physics.

But my real background is that I started playing games in high school. War games, primarily. Board war games from Avalon Hill and STI. That was always my primary hobby.

In 1976, microcomputers first became available. I took one look and said, "That's the way to do a game properly." I wrote a program for the school computer that actually played a war game. I was pleased with it, but I realized I needed my own computer.

I learned how to solder. I taught myself digital electronics. I started building circuits, bought computer kits. I built a computer, taught myself how to program in machine language, and I started working on computer games. I did that for about two years.

And in 1979 I got a job with Atari.

So the path I would recommend is like mine:

Do computer games if you love games. The wrong thing I see is somebody who's a good programmer saying, "Gee, I think I'll do computer games." That never works.

What does work is somebody who loves games first, and teaches himself programming second. And *then* does a computer game. aa

Readers' Feedback

Do you have a question or problem about hardware or software? Or have you discovered something that could help other Apple II or Macintosh users? If so, we want to hear from you. Write to Apple Feedback, P.O. Box 5406, Greensboro, NC 27403. We regret that we cannot provide personal replies to technical questions.

Freeze!

I'd like to know if there's a way I can freeze my screen when I LIST my Applesoft programs so that I can view a portion of it one screen at a time, and then just press a key to make it scroll again.

Geraldo G. Sevidal

Pressing Control-S (hold down the key labeled Control *and then press the* S *key) will freeze the listing on the screen. To restart the listing, just press Control-S again. Almost any key will restart it, but Control-S is easy, since your fingers are already there.*

The same method works in many different situations. When a BASIC program prints data to the screen, you can freeze it the same way. You can also freeze a disk's CATALOG listing with Control-S to look at the file names one screenfull at a time. Although the DOS 3.3 operating system automatically pauses after printing a screen's worth of filenames, ProDOS relies on you to stop the listing when you need to.

Pressing Control-S to freeze a listing has become a convention in Apple software, and experienced Apple users will try it whenever they want to stop a scrolling screen, even if they're not sure that the program will understand it.

What's Your Source?

I own an Apple IIc and I often hear about source code. Could you please tell me what this is and what it does?

Mike Marintzer

Most Apple II programmers write in one of two languages: BASIC or assembly language. Of these two languages, BASIC is easier to use while assembly language permits faster, more compact programs.

When a programmer enters a BASIC program, it's ready to run as soon as it's typed in. Assembly language programs require an extra step. Once the program is entered, the source code (what you have at this point) is processed by a program called an assembler. *This program makes an executable file called* object code. *Unlike source code, the contents of this file (the computer's* machine language*), aren't easily understood by people. The computer, however, does understand the file and can execute it very quickly.*

Assembly language also provides some protection for programmers who use techniques in their code that they'd rather not share. Since the source code and object code are separate files, the programmer can keep the source code while distributing the object code to customers, friends, or strangers. Others can execute the object code, but can't read the program to see how it works. Neither can they reassemble it or change it in any way.

Go Native Mode

I have an Apple IIc computer system and have expanded the computer with one megabyte of memory and the new 16-bit 65C816 microprocessor. Must I learn a new form of machine language to take advantage of the speed of the 65C816, or is its instruction set the same as used by the 65C02?

Chris Murphy

When the 65C816 microprocessor is in emulation mode, *it acts like a 65C02 in nearly every way, including its instruction set and the speed in which it executes these instructions. This is important, since many Apple programs are designed around the rate at which the microprocessor executes instructions. Most notably, the code in DOS 3.3 and ProDOS, which reads and writes to 5¼-inch disks, will not work unless it executes at a very exact rate.*

Programs written solely for the 65C816 will use it in what is called native mode. *In this operating mode, the microprocessor can execute some instructions in fewer clock cycles than the 65C02, meaning that it performs more operations per second. 65C816-specific code will also use some new instructions that can do more work with one instruction, including math operations that work on 16 bits (two bytes) of data at once instead of 8, and new ways of specifying data addresses* (addressing modes) *that allow one 65C816 instruction to replace several 65C02 codes.*

If you're thinking about learning 65C816 machine language, you can find out more in Roger Wagner's COMPUTE!'s Apple IIGS Machine Language for Beginners *($19.95), available from COMPUTE! Books (1-800-346-6767).*

The Scientific Trouble-Shooter

I recently bought the program *The Newsroom*, by Springboard Software, for my Apple IIc, and I've been having all sorts of problems running it. I tried the program on my friend's IIc, which has a beige keyboard (my keyboard is platinum), and although it worked with both my monochrome monitor and his color monitor, the program only works with my computer when it's hooked up to his color monitor. We arrived at this conclusion after several days of trying different setups with both of our equipment.

Any explanation, comment, or suggestions on this matter? Will I ever be able to run this program in my own computer with my own monitor?

Max A. Pinedo

From your description of the problem, it's very difficult to suggest what's wrong, other than a defective computer. But one part of your report sounds suspicious: that the program would run on your computer with a color monitor but not a monochrome display. The connection between an Apple and its monitor is strictly one-way. The Apple controls the image on the monitor—the monitor cannot affect the computer at all. We've never seen the type of monitor, or even the presence or absence of a monitor, make any difference at all in the operation of an Apple II computer.

But we do know how aggravated you can get tracking down a problem like this and how easy it is to get confused. Even the most experienced users occasionally run into puzzling situations. We were recently stumped by an malfunctioning Apple peripheral card before discovering that it only worked

correctly when the computer's cover was installed, apparently due to electromagnetic interference. It took a lot of head-scratching and many different hypotheses before we solved that puzzle.

Troubleshooting a problem like yours is a lot like diagnosing cars or electronic circuits. Some of the same rules apply. If you have an idea about what might be wrong, design a test to check only your hypothesis and as little else as possible—the scientific method. *If you think one part is to blame, like a disk, a mouse, or a cable, try replacing it with one that works in another system. Or try using your part in a system that works. Make only one change at a time, so you're certain of the effect of that one change, and repeat tests to make sure your recollections are correct, especially if you think the evidence suggests an unlikely cause (like the type of monitor that's connected). Sometimes writing down notes can help.*

Concerning your particular case: If you're still convinced that the program only runs on your computer with the color monitor, your computer may have some sort of spectacularly odd malfunction. If so, a visit to your dealer is in order.

Not As BASIC As It Looks

I have an Apple II communications program, written in BASIC, whose first line is:

```
0 POKE 103,1: POKE 104,44: POKE
  125,0: POKE 126,44: GOTO 0
```

I can't list the program past this line. It does no good to load the program and remove this line, either; it still won't list. Am I correct in assuming the line was installed by the author to prevent listing? If so, is there a way to overcome this?

Phil Hannum

Although you start this program with a RUN command, it's likely that there's less BASIC code to it than you might think. The commands in the line that you list change where the Apple thinks its BASIC program is stored. By changing the values in locations 103 and 104 with those POKE statements, your program moves the start-of-BASIC-program pointer to memory address 11265. What's at this address? Probably an entire BASIC program that was loaded as part of the file, which included the line you listed.

This file probably loads at the normal start-of-BASIC address, 2049, and starts with the text of line 0, followed by the end-of-program signal (three consecutive bytes with a value of 0). Only this isn't really the end of the file.

Typically, all the machine language code needed for high-speed telecommunications processing would follow the stub BASIC line. Then at address 11265 comes the real BASIC program. Depending on the program designer's preference, this could include anything from a single CALL statement, which runs the machine language, to a thousand lines of BASIC.

The second set of POKEs, which change locations 125 and 126, set the address-of-line-being-executed pointer. When BASIC executes a GOTO statement, it begins its search for the new line number at the statement containing the GOTO. Your program jumps to the second BASIC program by telling Applesoft to start looking after address 11264, and to look for and then execute line 0, which undoubtedly starts at 11265.

If you want to list this second program, type the first two POKE instructions, which change locations 103 and 104. Type them from immediate mode (at the] prompt). Then, type LIST.

Whether the author intended to prevent listing the program or not, that was the effect. But like any protection scheme, it can only make things difficult for a determined snooper, not impossible. And in the process, the author demonstrated a clever packaging scheme for combining BASIC and machine language programs.

Vanishing Variables

Some of my programs, in their developmental stages, require me to stop execution and make changes to a line or so of code. With my Apple II+, however, I have observed that editing will erase all the variables from memory. How can I preserve variables so that I can pick up where I left off?

Dirk Bayer

Most microcomputer BASICs behave this way. Any change to the code of the program will clear all variables. But, if you use the ProDOS operating system (it requires 16K of extra RAM to run on a II+), you can use its built-in STORE *and* RESTORE *commands to save all of a program's variables in a disk file. Here's what you do: Immediately after stopping the program, type* STORE VARS. *This will create a file called VARS with a filetype of VAR on the current active disk. Now, do your editing. When you're ready to start up the program again, type* RESTORE VARS; *ProDOS will read all the variables back from disk. However, don't type* RUN *to restart your program, since the* RUN *command clears all the variables. Use* GOTO *instead, sending your program to it's main menu or wherever you want.*

Readers with IIc's, IIGS's, or expanded IIe's should note that this command works extremely well with a ramdisk like the one named /RAM, which ProDOS automatically creates on these machines. The commands STORE /RAM/VARS *and* RESTORE /RAM /VARS *take almost no time to execute.*

Quick Hi-Res

I have heard that machine language hi-res screens are superior to BASIC ones. How is this possible, and how is it done?

Blaine Merker

The distinction between machine language and BASIC actually applies to programs, not to screen displays. Machine language and BASIC programs are equally capable of making any hi-res screen.

The difference is in speed and ease of use. Built-in BASIC functions like HPLOT, DRAW, and XDRAW don't have machine language equivalents. It's up to the machine language programmer to create everything on the screen by storing particular values in the bytes of memory which control the hi-res display. Most machine language programmers, however, will create subroutines to try to simplify their programs.

But, if the screen has to be drawn quickly, especially in a program using animation, the advantage of machine language is substantial. It is dozens of times faster. Another advantage of creating hi-res screens with ultra-fast machine language is that it can smoothly draw moving images, while BASIC animation almost always flickers.

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Waiting For The Next Generation

Dan Gutman

And They said, "Let there be laser!" With that They created CD audio, and it sounded good. Great, in fact. And CD audio begat CD-ROM, which begat CD-I, which begat CD-V, which begat DVI.

The compact disc is about to sprout all kinds of computer incarnations. A single CD, they tell us, can store more than 600 megabytes of data. Not just Springsteen data, mind you. But bits, bytes, music, animation, speech, text, and video. Truckloads of it! Forget about floppies. Hard disks? They're for wimps. All bets are that CD is going to take over the computer world just like it took over the record industry, which means the games we're going to see in the future will make today's computer entertainment look like primitive cave drawings. Here's a brief peek at the new formats:

• **CD-V.** One of the first disc formats to hit the market will be CD-V, in which a compact disc is filled with 20 minutes of digital audio and 5 minutes of video. The first nonmusic video title I've heard about is *Agatha Christie: The Scoop*, from Spinnaker. It's a full-motion video interactive movie mystery. Viewers switch tracks on their CD-V players at specified points during the game to uncover clues. And since there are over 200 paths through the game, it can be played again and again.

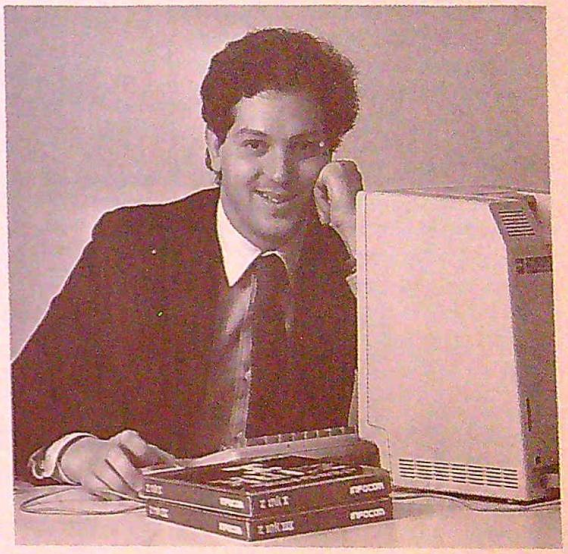
• **CD-I.** Compact Disc-Interactive. This format will combine audio, video, and interactivity to form what is called "talking books." CD-I software will play on stand-alone players that connect to a TV set and stereo, but *not* to a computer. No keyboard, no printer, no modem. For once, there won't be the pretense of the technology being for business applications—CD-I admits flat out that it's strictly for entertainment.

The Record Group, a Philips subsidiary, has created several titles, the first being an interactive guided tour called *London Any Way You Turn.* Another title, *The Time Machine*, will trace the history of civilization beginning from 700 B.C. The Record Group is also developing a musical encyclopedia (look up Bach, read about him, then hear his music).

Spinnaker is developing four CD-I products: a chess game based on their bestselling *Sargon III*; an SAT tutorial program; and two others, which have not yet been disclosed.

According to Emiel Petrone of American Interactive Media, which is a joint effort of Philips and Polygram Records,the first generation of CD-I players will retail for around $1,500, and software will vary from $19 to $60.

• **DVI.** RCA and General Electric teamed up to create DVI (Digital Video Interactive), which they announced in March 1987. It brings together motion, music, text, data, high-resolution still images, diagrams, voice-overs, and three-dimensional graphics models. It can even jam an hour of full-motion video onto a compact disc. DVI is expected to run on IBM compatible computers—at least in the beginning.



Mark Blank, founder of Infocom and creator of Zork.

A Familiar Face

I found out that one of the central figures in this whole compact disc hoopla is a familiar face: Infocom founder and *Zork* creator Mark Blank. When I heard that Blank, 32, was going to be in New York, I quickly wrangled an interview.

Gutman: So what's this I hear about you working on a CD-I disc with the guys at The Firesign Theater?

Blank: It's called *Danger in Dreamland* and is based on their Nick Danger character. It's basically a comedy album that has some interactivity. It's more or less a branching story where you look over his shoulder and help Nick decide what he should do. But it's really high on entertainment value and audio production values, and low on interactivity—intentionally.

Gutman: Did you write it?

Blank: I designed the gameplay. The Firesign people wrote it and they'll perform it. They really like

the spoken word. Actually, they're closer to the Infocom style, which I think of as more audio than video. It's more like radio than television.

Gutman: How did you team up with those guys?

Blank: They'd been working with Stan Cornyn at AIM (American Interactive Media). He was trying to push CD-I and doing demos for years trying to show people what a good idea it was before Philips and Sony were convinced to do it.

Gutman: Has it been filmed already?

Blank: No, CD-I is far enough away that it would be silly to do all the final production at this time. You'd be spending the money way before you would get it back. It will go into production May or June [1988] and be available at the end of the year.

Gutman: How did you get interested in CD-I?

Blank: I heard Stan Cornyn speak at the Microsoft conference [on CD-I] in February of 1986 and I talked to him afterwards. He was the only one who was doing it, and our opinions of what it should be jived completely.

Gutman: Are all the computer software companies getting into this?

Blank: To different degrees. I'm working on a CD-I product for Infocom. Electronic Arts is going into it in a big way, as they did with the Amiga. They see this as a platform for them to get in on a real mass-market product. The more technologically oriented companies are more interested than the marketing companies, such as Mindscape. Brøderbund will be 50/50.

Gutman: Is there a feeling that this is the entertainment of the future?

Blank: I think everyone has the hope that something will redeem the personal computer and make it more of a mass-market thing than it's ever become.

Gutman: Something like 15 percent of American homes have computers, and it's been that way for years now. Could CD-I be the thing that breaks through, like television or the VCR?

Blank: I think computers are *not* going to—their current incarnation. I think *this* could. I think that for consumers to embrace an interactive technology, it's got to be packaged more like a consumer product and less like a tool or high-tech toy that you have to learn. It can't come with software that has manuals and a machine that has to be plugged into a hundred things.

There's no such thing as user-friendly. There are different levels of unfriendliness, and they go from abusive to just unfriendly.

That's why I never got a home computer. I don't know which one to get. I like the Mac for some things and the PC for others. But I think CD-I addresses a lot of those issues. Do I think it's the ultimate thing and it will never progress? No, but it satisfies a lot of problems that computers have.

I think it's up to the software companies to make the titles that will cause consumers to get excited about it. If it fails, it won't be because the hardware concept is bad. It will be because we didn't deliver and give people a reason to buy the machine. People won't buy it because it's a fun toy. Well, some people will. But most people will buy it because they'll say, "Wow, this is something I can do with my leisure time that's kind of fun but doesn't come with all the guilt and fear that computers do."

I mean, I bought an Amiga recently and I had to set it up, and it was incredibly frustrating. I wished I could just plug it in and start using it. I had to read things and use Kickstart and fool with an operating system. It's as if they invented electricity and said every time you want to plug something in you have to run a wire, screw it in, and when you want to move it to another room you have to rewire your house. Computers are like airplanes for most people. They're too complicated to fly ourselves, so we pay someone to fly for us.

Computer literacy is insane. The thought that anyone has to program a computer is ridiculous. All that means is that computers are so primitive and the machines so clumsy that you have to be a programmer to use it. That's not a positive statement about the need for literacy, it's a statement for why computers are not the right device.

There's no such thing as user-friendly. There are different levels of unfriendliness, and they go from abusive to just unfriendly. The goal is to come up with something where the computer disappears. The computer should be invisible. It should be a viewing medium to get to the program. The more obtrusive it is, the less useful it is.

Gutman: It's comforting to hear someone like you say that.

Blank: It's terrible. That's what attracted me to Stan. He's the sort of person who desperately wants to embrace technology but finds that it has so many spears and arrows sticking out of it that embracing it is too painful.

Most computers make you feel stupid, and people don't want to feel stupid. Even with VCRs—some of them are so complicated, you want your 12-year-old to help you figure out how to program it.

Gutman: Who will be making the hardware for CD-I?

Blank: Philips, Sony, Panasonic, Yamaha—those are the big ones. The funny thing is that when you compare these companies to Apple, Commodore, and Atari, the computer companies are really small. The consumer electronics companies have a sense of what you have to do to sell to a big market. If Sony thought this was just going to penetrate 10 percent or 12 percent of American homes, I don't think they'd be interested. They're interested because they think it's going to do a lot more.

The Japanese and Europeans

have not been able to market a personal computer here, and I think that could be because their sensibilities are more mass market than current types of computers. And, they've been able to design a machine that satisfies a crucial criterion for a mass-market player—world compatibility.

Gutman: All CD-I players will be compatible?

Blank: Right. In order to have the CD-I label on the player, it must conform to certain specifications. You wouldn't go into a store and buy a CD audio disc and expect it not to work on your friend's player because he bought a different brand. The industry wouldn't take off because nobody would know what to buy and dealers wouldn't know what to carry.

But, you go into a software store and there's an IBM row, a Commodore row, and it's a pain. The idea here is to head that off at the beginning, rather than have Philips and Matshusta all fight over what the format is, set up the turf. They can still compete on features. They can make machines with fancier input devices or ports to plug in printers. But the base CD-I player will always play a CD-I disk.

Gutman: What about DVI? I hear it's more advanced than CD-I.

Blank: Well, I was there when they made the announcement and my immediate reaction was to yawn. Everyone else was getting really excited. DVI is a $2,000 chip set that is just starting to get an inkling of being used as a high-end peripheral on computers. It's very expensive technology. It doesn't specify a player, [but rather] an environment.

It's basically designed as a peripheral, while CD-I is a system. It's like the difference between getting some specialized add-on board and having a whole player. If the chips cost $2,000 it will be an $8,000 or $10,000 product. It was designed to be a high-end video processing tool for business and professional applications.

In the long run, that technology will become cheap enough to be a consumer technology, but the question is, at that point, will it be an enhancement to the CD-I? CD-I is expandable. DVI isn't a consumer technology. There's no such thing as a consumer product for $5,000.

It's not that the technology isn't good. It's unbelievable. But that doesn't mean you're going to see it in your home. And the Sony and Philips people are working on their own digital full-motion technology. In a funny way, the CD-I designers did the hard part—getting agreement of a large number of companies to stand behind a standard.

It's easy to come up with a fascinating new technology. It's like the Amiga. Everybody applauded the Amiga, but the marketing was wrong, the pricing was wrong. Just having a cute technology is not enough to sell a product.

If Sony thought that this [CD-I] was just going to penetrate 10–12 percent of American homes, I don't think they'd be interested.

I think the stupid thing the CD-I people did was announce it two years before it was going to be available. That really hurt them. If they had announced it now and said it's coming in nine months, it would have had a lot more impact. The DVI people handled that better. When they announced, they had something to show.

Gutman: What kind of games are going to come out for CD-I?

Blank: I think *Danger In Dreamland* is an example of something that will have lower interactivity, higher entertainment value. People will be translating traditional computer games because that's the obvious thing to do. The flight simulator will have a real photograph instead of computer graphics. If Electronic Arts does *Earl Weaver Baseball*, it may have Earl Weaver actually talking to you on digital audio.

Gutman: Do you see Hollywood getting involved?

Blank: Oh yeah, but later. Hollywood does not quickly embrace new technology. Hollywood is not high tech. But Polygram is a record company, and they're interested. They see it as a high-end record player. Everyone will look at it and see it as a reflection of their business. Hollywood will embrace it when the market starts to be there. Then you're going to see really expensive productions. You'll see million dollar software products. The Hollywood people know about it, and in the back of their minds they're thinking, "Maybe someday this will be part of our business—but not yet."

Gutman: Do you see a day when we'll be able to interact with Arnold Schwarzenegger in his new movie?

Blank: It's possible. It would be very expensive to produce. That will come when full-motion is able to be produced easily and when there's enough money in it where you can do real quality productions. My guess is, that is five or more years away.

If you step back from Schwarzenegger, I can imagine less professional productions. I mean, I can write something called *Border Zone* and have it accepted as a computer medium. If it were a mass market thing, I would probably use a Robert Ludlum story for the recognition. In the early days, you can do something original and have it accepted because it's a smaller market. So initially you may find things that are less slick professionally. Actually, it's more likely you'll talk with Arnold rather than interact with pictures of him.

Gutman: Will people want to play all-text games once we have CD-I?

Blank: In 20 years, it's hard for me to believe that anything like what we're seeing today will be done the same way. It's going to be evolutionary. Even if CD-I is very successful, the Apples and Macs are not going to disappear. There are always going to be new

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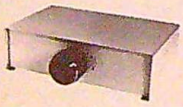

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technologies. The question is: What is the critical element of an Infocom game? Is it the fact that words appear on the screen, or is it that it's an interactive story? If the words were spoken to you, or if you saw the action, would that still be inherently an Infocom game? I would argue yes. It's using a different medium to do the same thing.

I mean, books didn't disappear when movies and radio came out. Movies are more sophisticated, but people who like literature still prefer to read than see anything on a screen. I have to think about that. My guess is there will always be a place for them.

Gutman: What are the limitations of CD-I?

Blank: You won't be able to do full-motion video easily. I don't think that's a drawback, because I don't think anyone can afford to make TV-like original productions anyway. Animation you'll be able to do.

It's like asking what are the limitations of computers. Most of the limitations are in the software design. Software is always way behind hardware. You can have two megabytes of memory and have no idea how to make a better game with it. The limitations are the creativity of the people who are doing the designing.

CD-I will be made or broken on the basis of whether or not people will come up with things that capture consumers' imaginations and make them say, "Yeah, I like this device. I want to have it." I don't look at CD-I as having any inherent limitations, because it's an expandable medium. And it can do so much more than current personal computers can do, so you begin to sound silly if you pick at it.

Gutman: Do you think CD-I could come out and consumers are going to say, "I don't want to interact with images. I want to be a couch potato."

Blank: Sure, it's possible. On the other hand, how many couch potatos do you know who sit there with remote controls? Joe Couch Potato has 182 channels of cable, rents movies, and tapes video. I think people have shown themselves to be very willing to take charge of their programming. That's being interactive. Does that mean they want to stare at the screen and make a decision every two seconds? No. But that's not the only kind of software you can produce.

Gutman: Do you think of yourself as a pioneer?

Blank: Yes and no. I enjoy doing things that are new and different and expanding what has been done. I consider myself more of an evolutionary thinker than a revolutionary thinker.

I'm less interested in where we'll be ten years from now than in the steps we can take to get there. I guess I think of myself as a futurist with an engineer's mentality. I can talk about the day when you'll sit in environment booths and stories will happen around you and you'll actually feel it when somebody punches you—I can do that, but it doesn't tell me how to get there. The future of this stuff is made up of a lot of little steps, and everything we do is another step. I think CD-I is one of the bigger steps up, and it will take years for people to understand what to do with it.

I mean, when we founded Infocom, we had no idea that what we had would be interesting to anybody but ourselves. Most authors are insecure or think people won't like what they're doing. Mike Dornbrook believed in interactive fiction more than I did. When Mike first saw *Zork*, he said, "Ten years from now, everybody's going to be playing this." And we all laughed.

And They looked upon these exciting new technologies and saw that they were good. They needed only to work out the marketing, distribution, and educating of the public. "These new forms of CD will be available sometime next year," They sayeth.

Dan Gutman is the author of I Didn't Know You Could Do THAT With a Computer! *(COMPUTE! Books) and writes a syndicated newspaper column of the same name.* aa

Tips, Tricks, & Tidbits

Each issue, "Tips, Tricks, & Tidbits" serves up a wealth of information on programming and applications software for Apple II and Macintosh personal computers. If you have an interesting (and unique) solution to a programming problem, or a tip or tidbit on almost any popular application program, send it to Apple/Mac Tips, COMPUTE!'s Apple Applications, P.O. Box 5406, Greensboro, NC 27403. We'll pay $25–$50 for each tip we publish.

[Editor's Note: We again asked Vincent O'Connor, collector of Apple II programming and application bugs, to share more of his tidbits. This issue, Vince offers up a collection of applications tips. Next issue, we'll begin publishing reader tips and tricks.]

AppleWorks And Epson Printers

One of the advantages of owning a newer Epson printer is that almost every model has a feature called SelecType. This feature allows you to choose typestyles such as near–letter quality, elite printing, and compressed printing using buttons on the front panel of the printer. Unfortunately, the *AppleWorks* word processor resets the printer before printing a document. This reset operation cancels any setting made using SelecType.

The Epson manuals recommend that you either change the dip switches every time you want to change print styles, or configure the printer as a custom printer, replacing features that you don't plan to use with the codes for the desired SelectType features. However, neither of these options are as easy or convenient as choosing a typestyle by the press of a button.

The solution to the problem is actually quite simple. Wherever you want to change typestyles with SelectType, use the Print Options Menu (Open Apple–O) and enter the Pause Here (PH) command. If you want to print the entire document in one SelecType print style, for example, then place the Pause Here command before anything else in the document. When the printing stops, choose the typestyle with SelectType and then press the space bar to continue printing. This method works because the reset command has already been sent to the printer. So any SelecType commands that you enter now remain until you change them or until you print another document.

AppleWorks Resurrection

There are times when *AppleWorks* suddenly locks up— nothing you type on the keyboard appears on the screen, you can't move the cursor, and all you can do is swear, knowing that whatever you haven't saved is lost. You can always press Control-Reset and then reenter *AppleWorks*, but any data previously in memory is erased.

Here's a routine that works with all versions of *AppleWorks* from 1.1 through 2.0, courtesy of Tom Weishaar, editor of *Open-Apple* and author of Beagle Brother's *Pronto DOS*. This routine allows you to reenter *AppleWorks'* main menu with your data intact.

Once *AppleWorks* locks up, press Control-Reset. You will lose the 80-column screen and see what appears to be garbage. You should also see an asterisk at the lower left-hand corner of the screen with a flashing cursor immediately after it. This indicates that you're in the Monitor. Now type

```
C073:0
3 <Control-P>
```

(pressing Return after each line, just as you will after each of the lines below).

You should now be back in 80-column mode, with the asterisk at the upper left-hand corner of the screen. Now type

```
2F0:2C  83  C0  2C  83  C0  4C
```

If you have version 1.1, 1.2, or 1.3, type

```
:33  10
```

If you have version 2.0, type

```
:27  11
```

Finally, enter

```
2F0G
```

You should now be back in the main menu. If the menu has some garbage in it, just press Escape. Now save the file or files you have in the desktop and reboot.

Look Ma, No Mail Merge

Prior to version 2.0, *AppleWorks* had no built-in mail-merge capabilities. This meant that if you wanted to merge names and addresses from your database into a form letter, you had to buy an add-on program from another software publisher. But many people who have a pre-2.0 version of *AppleWorks* do not want to upgrade or buy a mail-merge program.

If you fit in this group, you can get around the lack of a mail-merge feature by using the little-known Enter Keyboard (EK) printer option. This command stops the printer and lets you type in information from the keyboard. To use, press Open Apple–O for the printer options menu and type in EK wherever you want names and addresses to appear. Next, print as many copies of the document that you want.

Every time an EK command is encountered, *AppleWorks* stops printing, clears the screen from the command down, and prints

You can type information to be placed at the point marked above. At the bottom of the screen is the prompt *Information?* and the cursor. Just type in what you want and press Return. The document resumes printing and continues until it is finished or until another EK command is encountered.

AppleWorks Spreadsheet Comparisons

There are times when it would be handy to quickly compare two figures in an *AppleWorks* spreadsheet. Looking at rows and rows (or columns and columns) of figures to see if and where the numbers vary can quickly lead to eye and brain strain—especially if you're looking at large figures, or figures where the difference is very small.

Here's one way you can do it. First, select a column to hold the results of the comparison. Next, change the width of the column until it is only one character wide. This is done by pressing Open Apple–L (for layout commands), then C (for column), Return (to include just the column the cursor is in), C (for column width), and Open Apple–left arrow until the column is just one character wide. Next, enter the following formula, where C1 and C2 are the cells of the numbers you want to compare:

```
@IF(C1>C2,@NA,@IF(C1=C2,
  @ERROR,99))
```

Here's what the formula does: If the number in cell C1 is greater than the number in cell C2, print NA; if the number in cell C2 equals the number in cell C2, then print ERROR; finally, if the number in cell C1 is less than the number in cell C2, print 99.

Because the comparison field is only one character wide, only the first character of the formula's output is displayed. Thus, if the two numbers are equal, you'll see an *E;* if the first number is larger than the second, you'll see an *N;* and if the first number is smaller than the second number, you'll see a #. In the latter case, a pound sign appears because *AppleWorks* prints pound symbols (#) when a cell is too narrow to print a numeric value.

Dazzle Draw And Color Printers

With *Dazzle Draw,* you can create graphics images that can be printed in color. The drawback is that *Dazzle Draw,* like almost all graphics programs that let you print in color, supports only two color printers: the Imagewriter II and the Scribe. They do so because these two printers are by far the most popular, having become the defacto Apple industry standard. This leaves owners of other color printers out in the cold.

The solution to this problem is to buy the FingerPrint Plus card from Thirdware Computer Products (4747 NW 72nd Ave., Miami, FL 33166, 1-305-592-7522). There are actually three cards: one for the II+ and IIe, one for the IIc, and one for the IIGS. These cards allow you to print any type of graphics picture on almost any color printer, including the C. Itoh 1570 and 8510, Quadram Quadjet ink-jet, Okimate, Epson JX-80, and Diablo printers. In fact, you can print anything that appears on your screen, such as menus and help screens, as well as low-res, hi-res, and double-hi-res graphics.

Each card has a button that, when pressed, interrupts the program which is running and displays a menu. You can then print whatever's on the screen and return to your original program.

The II+/IIe version of the card lists for $149 and has both a Super Serial compatible serial port and a Grappler+ compatible parallel port. The IIc version installs under the keyboard, uses the built-in serial ports, and lists for $109. The IIGS version uses the machine's printer ports, has pull-down menus, works with a mouse, allows access to the Control Panel from within any program, lets you use the built-in printer port—even if the software that you're using won't—and lists for $99. All three cards offer numerous other useful features as well.

Free Game With *Print Shop Companion*

Do you like playing games? Well, if you have a copy of *The Print Shop Companion,* then you also have a free game called Driver that's not mentioned anywhere in the documentation. To play the game, place Side two of the disk into the drive and boot the computer. You'll see a message on the screen telling you that the disk is not bootable and to press Return to boot another disk. Instead, press Escape; then press Control-^ and start playing (or should I say driving?).

Apple Writer And The IIGS

The ProDOS-based version of *Apple Writer* works on the IIGS, but it does not print through the IIGS's built-in serial port. Obviously this can be very frustrating for IIGS owners who want to use *Apple Writer* without being forced to buy a serial printer interface card.

Fortunately, there is a way to patch *Apple Writer* so that it prints through the IIGS serial port. To install the patch, type in Program 1 and save it to disk as AW.PATCH.

Program 1: ***Apple Writer*** **Patch**

```
5 REM ALLOW APPLE WRITER TO USE
   IIGS SERIAL PORTS
10 TEXT : HOME : CLEAR :D$ = CH
   R$ (4)
15 VTAB 12: PRINT "PLACE DISK W
   ITH APPLE WRITER IN DRIVE 1"
   : PRINT "THEN PRESS <RETURN>
   ";
20 WAIT - 16384,128:A = PEEK (
   - 16384): POKE - 16368,0: IF
    A < > 141 THEN 20
25 PRINT D$"BLOAD AWD.SYS,A$200
   0,TSYS"
30 IF PEEK (19888) < > 160 OR P
   EEK (20327) < > 1 OR PEEK (2
   0334) < > 19 THEN HOME : VTA
   B 12: PRINT "INCORRECT VERSI
   ON OF APPLE WRITER.": END
35 POKE 19888,96: POKE 20327,16
   : POKE 20334,19
40 PRINT D$"UNLOCK AWD.SYS": PR
   INT D$"BSAVE AWD.SYS,A$2000,
   TSYS": PRINT D$"LOCK AWD.SYS
   ": HOME : VTAB 12: PRINT "AP
   PLE WRITER PATCH INSTALLED."
   : END
```

To use the program, enter

```
RUN AW.PATCH
```

and follow the screen prompts.

Note: Never use an original copy of your *Apple Writer* disk. Always use a backup copy.

This patch only works on Apple Writer ProDOS version 2.0. Additionally, it disables the Control Panel's set modem/printer interface option, since *Apple Writer* now treats the IIGS serial ports, and any serial interface card, as though it were a third-party interface card rather than a Super Serial card. aa

Locker

Russell Gibson

Worried about prying eyes seeing what's on your disks or what's in your files? Disk security, especially in the office or at school, should not be taken for granted. This easy-to-use program lets you lock your disks from unauthorized use, using up to four levels of passwords that you define. For any Apple IIe, IIc, or IIGS computer using all versions of ProDOS (except 1.0 and 1.0.2) and BASIC.SYSTEM.

Securing your disks, and the files on them, should be an important part of your computing. I should know. Someone stole one of my programs.

If you've got your business records—payroll, for instance—on disk, you can't just leave that disk unprotected. And if you use a computer in your classroom—whether you're a teacher or student—you'll want to make sure only you (and those people you trust) can use that disk. This can become particularly important when one computer is shared between several teachers or students, or when disks are stored in a common location.

"Locker" is a simple-to-use set of programs for your Apple IIe, IIc, or IIGS computer that effectively locks your disks. Once locked, they can be used only when the proper password combinations are entered, and since you can specify up to four levels of passwords with your own defined codes, you can rest assured that only those with a "need to know" will be using those disks and accessing those files.

Forge The Lock

Locker is not one program, but three. All three programs must be typed in and saved to a ProDOS-formatted disk before you can lock up anything.

Format a disk (as a ProDOS disk) using the *System Utilities* or *ProDOS User's Disk*. Next, copy the files PRODOS and BASIC.SYSTEM from *System Utilities* or *ProDOS User's Disk* to your newly formatted disk.

(If you're using an Apple IIGS, copy the file P8 from the subdirectory SYSTEM to your new disk, then rename P8 as PRODOS. Of course, also copy BASIC.SYSTEM from the *Apple IIGS System Disk* to your new disk.)

You're now ready to begin typing in Locker. Because two of the three programs contain long lists of DATA statements and accompanying numbers, be sure to use "Apple Automatic Proofreader," the typing utility found elsewhere in this issue, to type in all the parts of Locker.

- Type in Program 1, "Install," and save it to disk as *INSTALL*.
- Type in Program 2, "Locker," and save it to disk as *LOCKER*.
- Type in Program 3, "Startup," and save it to disk as *STARTUP*.

Note: It's vital that you save these files to disk using the filenames listed above.

Don't run any of the programs until you've saved all three to disk. When they're safely on disk, however, you can continue by typing

```
RUN INSTALL
```

The screen blanks for a few moments, and then the message ONE MOMENT appears for approximately one minute. The disk drive should be running while the message is on the screen, because INSTALL is saving two binary files to your disk.

When the BASIC prompt reappears, type **CATALOG** and you should see the new files LOCK and LOCK2 now on the disk. You can delete both programs since they've already been used.

ProDOS has also changed. It's grown slightly and has been unlocked (if it was locked before). BASIC.SYSTEM also has had something added to it, although you won't notice any difference in it by CATaloging the disk.

Lock It Up

Run Program 2, Locker, by typing

```
RUN LOCKER
```

and pressing Return.

Locker clears the two hi-res pages and then asks you how many password levels you want to use to lock your disk. Reply by pressing the 1, 2, 3, or 4 key.

Now type in the first password prompt. If you're going to use your social security number as the password, for instance, you'll probably want to have Locker display the message ENTER SOCIAL SECURITY NUMBER on the screen.

After you've typed in the prompt, Locker asks for the proper response to that prompt. For example, your social security number might be 123-45-6789. Type in that number and press Return.

Continue in this fashion until all the password prompts and responses are entered (up to level 4).

A few cautions about typing in prompts and responses:

- A total of 248 characters is available—124 for the prompts, 124 for the responses. (Each prompt or response can be, at most, 31 characters long.) If you use more than that number of characters for all password levels, the program makes you start over.
- Enter your prompts and responses slowly and carefully. Proofread each before pressing Return to insure that spelling is correct and the responses are as you expect. If you lock a disk with a misspelled password, for instance, you run the risk of losing access to that disk yourself.
- Do not use commas and colons in your prompts.

A brief ONE MOMENT message appears on the screen, followed by the normal BASIC cursor. Type **CATALOG** and you'll notice that the file PRODOS is now locked. You're ready to try out Locker. (Before you do, make a copy of this disk, just in case.)

Where'd They Go?

Program 3 is named STARTUP on purpose. BASIC.SYSTEM automatically loads and executes any program called STARTUP when the disk boots. To lock and unlock a disk, you need this program because it adds the QUIT command to BASIC.SYSTEM.

In normal use of Locker, you'll type **QUIT** just before taking the disk out of the drive. (Entering QUIT encodes the directory.)

For now, though, just type

```
RUN STARTUP
```

and press Return.

Type **QUIT** and CATALOG the disk again. All that appears are the listings for PRODOS and BASIC.SYSTEM. Where's everything else?

Don't worry. The other files are still on the disk (they haven't gone anywhere), but they're unreachable at the moment. In effect, this disk is now locked.

To unlock this disk, simply reboot the computer—either by turning it off and then on again, or by pressing the Open Apple-Control-Reset keys. The password prompts you to enter your response(s). If you followed the example above, you would type in the social security number 123-45-6789. Remember, the response must match *exactly* with what you entered earlier, even to the proper use of upper- and lowercase.

Locker doesn't echo your input to the screen, so it doesn't matter if someone can see the screen—your typing does not appear. Just another example of Locker's thoroughness.

If you enter the response(s) correctly, you'll see a CODE ACCEPTED message flash on the screen while BASIC.SYSTEM loads and runs. After a brief pause, you'll see the BASIC prompt again. Then, STARTUP will load and run.

Type **CATALOG** again and you'll see that your programs have reappeared. Actually, they never left.

> When you're using a locked disk, *make sure you type **QUIT** before you take the disk out of the drive or turn off the computer.* Whenever you access a locked disk, it becomes unlocked until you type **QUIT**. That means if you use a locked disk and forget to type **QUIT**, anyone can get to the files on that disk.

Lock Other Disks

To use Locker with other disks, you must follow several guidelines.

- Format the disk as a ProDOS disk.
- Copy the files PRODOS and BASIC.SYSTEM, in that order, to the disk.
- It's best to use Locker only with newly formatted disks, since PRODOS and BASIC.SYSTEM *must* be the first two files (in that order) on the disk. Another reason is that a filled disk may lose some of its files when Locker uses disk blocks 276–279. Locker does *not* check to see if those blocks are already occupied—if they are and Locker writes to them, *the data in those blocks is permanently lost.*
- Copy STARTUP and LOCKER to the disk. Having LOCKER immediately available will make it easy to change your passwords. Run LOCKER (Program 2) again to alter the prompts and/or responses necessary to gain access to your disks.

Pick The Lock

We all make mistakes. We're all forgetful. That's why Program 4 is included with the Locker system. A short BASIC program, "Finder" locates and displays the proper responses for accessing a Locker-locked disk.

Of course, there's a certain contradiction to publishing a disk security program and in effect, its key, in the same place. We couldn't see any way around it.

There will come a time when you'll be thankful for Finder. If we didn't publish it, we'd get letters from people who have forgotten a password and have, thus, irretrievably locked away a vital file. And if we offered to send Finder to you only when you asked for it, well, that's almost as inconvenient as not offering it at all.

If you're using Locker in some situations—your classroom perhaps—it will serve you and your Locker users better if you simply don't tell them of Finder. (Assuming they don't read this issue of Apple Applications.)

Type in and save Program 4 to a disk that *hasn't* been modified with the Locker system (that way, you can load and run it without remembering a password for *its* disk). Load the program into memory by typing

LOAD FINDER

and pressing Return. Next, put the locked disk in the drive and type

CAT,S6,D1

substituting the appropriate slot and drive numbers (5¼-inch disks are almost always slot 6, drive 1 or 2, while 3½-inch disks are almost always slot 5, drive 1 or 2). You'll see the locked version of the CATALOG. The important thing to look for is the disk volume name at the top.

Now, type

PREFIX */disk volume name/*

and press Return.

Finally, type

RUN FINDER

and you'll see the correct responses for that disk on the screen. If you defined fewer than four passwords, those not used are shown by two quotation marks(" ").

Program 1: Install

Be sure to use "Apple Automatic Proofreader" to enter the following program.

```
74 5 REM COPYRIGHT 1988 COMPUTE! PUBLICATI
     ONS, INC. ALL RIGHTS RESERVED.
FD 10 HOME : VTAB 12: PRINT "ONE MOMENT...
     ..": FOR I = 24064 TO 24287: READ J:
      POKE I,J:C = C + J: NEXT I
0C 20 FOR I = 19200 TO 19423: READ J: POKE
      I,J:C = C + J: NEXT I
C6 30 FOR I = 768 TO 935: READ J: POKE I,J
     :C = C + J: NEXT I
6A 40 FOR I = 24288 TO 24575: POKE I,0: NE
     XT I
1E 50 IF C < > 68251 THEN PRINT "ERROR IN
     DATA": STOP
0B 60 D$ = CHR$ (4): PRINT D$;"BSAVE LOCK,
     A$5E00,E$5EFF": PRINT D$;"BSAVELOCK2
     ,A$4B00,E$4BDF"
B8 70 POKE 6,70: CALL 768: IF PEEK (6) = 0
      THEN STOP
D8 80 HGR : HGR2 : TEXT : PRINT D$;"BLOAD
     PRODOS,A$2000,TSYS"
9F 90 X1 = PEEK (8192):X2 = PEEK (8193):X3
     = PEEK (8194)
C5 100 PRINT D$;"BLOAD LOCK": POKE 24223,X
     1: POKE 24228,X22: POKE 24233,X3: P
     RINT D$;"UNLOCK PRODOS"
C1 110 POKE 8192,76: POKE 8193,0: POKE 819
     4,94: PRINT D$;"BSAVE PRODOS,A$2000
     ,E$5FFF,TSYS"
68 120 HGR2 : TEXT : PRINT D$;"BLOAD BASIC
     .SYSTEM,A$2000,TSYS": PRINT D$;"UNL
     OCK BASIC.SYSTEM": PRINT D$;"BLOAD
     LOCK2"
03 125 XX = PEEK (8192): POKE 19223,XX:XX
     = PEEK (8193): POKE 19228,XX:XX = P
     EEK (8194): POKE 19233,XX
08 130 POKE 8192,76: POKE 8193,0: POKE 819
     4,75: PRINT D$;"BSAVE BASIC.SYSTEM,
     A$2000,E$4BDF,TSYS": PRINT D$;"LOCK
      BASIC.SYSTEM"
90 140 DATA 169,0,141,242,3,169,94,141,243
     ,3,73,165
41 150 DATA 141,244,3,141,12,192,32,88,252
     ,76,81,94
C3 160 DATA 44,0,192,16,251,173,16,192,173
     ,0,192,234
27 170 DATA 234,73,255,96,160,0,166,7,232,
     189,0,95
05 180 DATA 240,6,145,254,232,200,208,245,
     134,7,96,166
FF 190 DATA 6,232,32,24,94,221,128,95,240,
     247,189,128
1D 200 DATA 95,240,3,76,176,94,134,6,96,16
     9,255,133
6B 210 DATA 6,133,7,169,40,133,254,169,5,1
     33,255,32
C3 220 DATA 40,94,32,59,94,169,168,133,254
     ,32,40,94
E0 230 DATA 32,59,94,230,255,169,40,133,25
     4,32,40,94
82 240 DATA 32,59,94,169,168,133,254,32,40
     ,94,32,59
E3 250 DATA 94,32,88,252,162,0,189,206,94,
     240,6,157
39 260 DATA 53,6,232,208,245,32,195,94,32,
     195,94,32
9C 270 DATA 195,94,169,165,141,0,32,169,67
     ,141,1,32
DC 280 DATA 169,141,141,2,32,76,0,32,169,0
     ,141,244
C3 290 DATA 3,162,0,157,0,48,157,0,32,232,
     208,247
C0 300 DATA 76,192,94,160,0,162,0,202,208,
     253,136,208
8F 310 DATA 250,96,67,79,68,69,160,65,67,6
     7,69,80
68 320 DATA 84,69,68,0,0,0,0,0
F3 330 REM SECOND PROGRAM
04 340 DATA 76,15,75,32,0,191,0,40,75,144,
     3,76
A8 350 DATA 198,75,96,173,184,4,201,193,
```

```
      240,28,169,169
AF 360 DATA 141,0,32,169,154,141,1,32,169,
      133,141,2
82 370 DATA 32,76,0,32,3,96,0,0,0,0,0,0,0
EC 380 DATA 0,0,169,96,141,43,75,169,1,141
      ,45,75
E4 390 DATA 169,20,141,44,75,169,128,141,6
      ,75,32,3
16 400 DATA 75,238,44,75,238,43,75,238,43,
      75,32,3
18 410 DATA 75,238,44,75,238,43,75,238,43,
      75,32,3
1A 420 DATA 75,238,44,75,238,43,75,238,43,
      75,32,3
E2 430 DATA 75,169,0,133,6,169,96,133,7,16
      0,0,177
94 440 DATA 6,73,255,145,6,200,208,247,230
      ,7,165,7
B5 450 DATA 201,104,208,239,169,129,141,6,
      75,169,96,141
22 460 DATA 43,75,169,2,141,44,75,169,0,14
      1,45,75
45 470 DATA 32,3,75,238,43,75,238,43,75,23
      8,44,75
47 480 DATA 32,3,75,238,43,75,238,43,75,23
      8,44,75
49 490 DATA 32,3,75,238,43,75,238,43,75,23
      8,44,75
03 500 DATA 32,3,75,76,22,75,133,6,32,45,2
      55,169
83 510 DATA 160,32,237,253,169,164,32,237,
      253,165,6,32
FB 520 DATA  218,253,76,22,75,0,0,0
0F 530 REM THIRD PROGRAM
B6 540 DATA 32,0,191,128,147,3,144,20,133,
      6,32,45
BA 550 DATA 255,169,160,32,237,253,169,164
      ,32,237,253,165
52 560 DATA 6,76,218,253,173,34,96,106,144
      ,64,106,144
58 570 DATA 61,106,144,58,106,144,55,234,2
      34,32,153,3
96 580 DATA 32,0,191,129,147,3,96,194,204,
      207,195,203
47 590 DATA 211,160,178,183,181,173,178,18
      3,185,160,201,206
0D 600 DATA 160,213,211,197,161,0,0,195,16
      9,207,206,212
54 610 DATA 201,206,213,197,160,207,210,16
      0,211,169,212,207
BD 620 DATA 208,0,32,88,252,162,0,189,55,3
      ,240,6
FC 630 DATA 157,168,5,232,208,245,162,0,18
      9,79,3,240
35 640 DATA 6,157,40,6,232,208,245,44,0,19
      2,16,251
6A 650 DATA 173,16,192,141,168,6,201,195,2
      40,157,169,0
93 660 DATA 133,6,96,3,96,0,96,6,0,173,34,
      96
E3 670 DATA 41,240,141,34,96,96,0,0,0,0,0,
      0
```

Program 2: Locker

Be sure to use "Apple Automatic Proofreader" to enter the following program.

```
74 5 REM COPYRIGHT 1988 COMPUTE! PUBLICATI
     ONS, INC. ALL RIGHTS RESERVED.
29 10 HGR : HGR2 : TEXT : HOME : HTAB 13:
     PRINT "COPYRIGHT 1988": HTAB 7: PRIN
     T "COMPUTE! PUBLICATIONS, INC."
75 11 HTAB 10: PRINT "ALL RIGHTS RESERVED.
     ": PRINT
C9 20 INPUT "HOW MANY QUESTIONS TO ACCESS
     DISK (1-4)";QD
E7 25 IF QD < 1 OR QD > 4 THEN 10
4C 30 B = 4:C = 4:X = 4: FOR A = 1 TO QD:X
      = X + 1
79 40 VTAB X + 4: HTAB 1: PRINT "ENTER QUE
     STION ";A;: INPUT QS$(A): IF LEN (QS
     $(A)) > 31 THEN GOSUB 70: GOTO 40
4B 50 VTAB X + 8: HTAB 1: PRINT "ENTER ANS
     WER ";A$;: INPUT AN$(A): IF LEN (AN$
     (A)) > 31 THEN GOSUB 70: GOTO 50
1E 60 NEXT A: HOME : VTAB 12: PRINT "ONE M
     OMENT.....": GOTO 80
9C 70 VTAB 22: HTAB 8: PRINT "*** ONLY 31
     CHARACTERS ***": HTAB 8: PRINT "***
     ALLOWED PER ANSWER ***": RETURN
30 80 FOR I = 768 TO 774: READ J: POKE I,J
     : NEXT I
E2 90 D$ = CHR$ (4): PRINT D$;"BLOAD PRODO
     S,A$2000,TSYS"
B7 100 IF QD = 1 THEN POKE 24165,76: POKE
      24166,133: POKE 24167,94
4D 110 IF QD = 2 THEN POKE 24175,76: POKE
      24176,133: POKE 24177,94
2D 120 IF QD = 3 THEN POKE 24187,76: POKE
      24188,133: POKE 24189,94
D7 130 FOR I = 24320 TO 24575: POKE I,0: N
     EXT I
5E 140 CT = 24320: FOR A = 1 TO QD
FA 150 FOR B = 1 TO LEN (QS$(A)): POKE CT
     + B - 1, ASC ( MID$ (QS$(A),B,1)) +
      128: NEXT B:CT = CT + B: NEXT A
87 160 CT = 24448: FOR A = 1 TO QD
ED 170 FOR B = 1 TO LEN (AN$(A)): POKE 769
     , ASC ( MID$ (AN$(A),B,1)): CALL 76
     8
81 180 POKE CT + B - 1, PEEK (6): NEXT B:C
     T = CT + B: NEXT A
A2 190 PRINT D$;"UNLOCK PRODOS"
52 200 PRINT D$;"BSAVE PRODOS,A$2000,E$5FF
     F,TSYS"
8F 210 PRINT D$;"LOCK PRODOS"
44 220 DATA 169,0,73,255,133,6,96
```

Program 3: Startup

Be sure to use "Apple Automatic Proofreader" to enter the following program.

```
74 5 REM COPYRIGHT 1988 COMPUTE! PUBLICATI
     ONS, INC. ALL RIGHTS RESERVED.
DC 10 FOR I = 38893 TO 39316: READ J: POKE
      I,J:C = C + J: NEXT I
46 20 IF C < > 48418 THEN PRINT "ERROR IN
     DATA": STOP
DC 30 CALL 38893
28 40 DATA 169,148,133,116,169,0,133,115,1
     69,152,141,8
CA 50 DATA 190,169,19,141,7,190,96,32,0,19
     1,128,100
8D 60 DATA 152,144,3,76,102,153,96,0,0,0,0
     ,0
A2 70 DATA 0,0,216,120,173,0,2,201,209,240
     ,7,201
C2 80 DATA 241,240,3,88,56,96,173,1,2,201,
     213,240
19 90 DATA 4,201,245,208,242,173,2,2,201,2
     01,240,4
EA 100 DATA 201,233,208,231,173,3,2,201,21
     2,240,4,201
DD 110 DATA 244,208,220,169,0,141,84,190,1
     41,83,190,169
27 120 DATA 3,141,82,190,169,190,141,81,19
     0,169,158,141
```

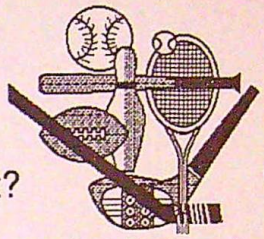
```
DB 130 DATA 80,190,76,108,152,0,0,0,128,0,
      0,3
D4 140 DATA 96,0,32,20,1,0,0,169,2,141,104
      ,152
BA 150 DATA 169,0,141,102,152,141,105,152,
      169,32,141,103
2F 160 DATA 152,169,128,141,97,152,32,0,15
      2,238,104,152
46 170 DATA 238,103,152,238,103,152,32,0,1
      52,238,104,152
48 180 DATA 238,103,152,238,103,152,32,0,1
      52,238,104,152
51 190 DATA 238,103,152,238,103,152,32,0,1
      52,169,0,133
2E 200 DATA 6,169,32,133,7,162,8,160,0,177
      ,6,73
FA 210 DATA 255,145,6,200,208,247,230,7,20
      2,208,242,169
DA 220 DATA 1,141,105,152,169,32,141,103,1
      52,169,0,141
43 230 DATA 102,152,169,20,141,104,152,169
      ,129,141,3,152
74 240 DATA 32,0,152,238,104,152,238,103,1
      52,238,103,152
76 250 DATA 32,0,152,238,104,152,238,103,1
      52,238,103,152
78 260 DATA 32,0,152,238,104,152,238,103,1
      52,238,103,152
FA 270 DATA 32,0,152,169,0,141,102,152,141
      ,105,152,169
21 280 DATA 32,141,103,152,169,2,141,104,1
      52,169,128,141
52 290 DATA 3,152,32,0,152,169,33,133,7,16
      9,0,168
D5 300 DATA 145,6,200,208,251,160,121,198,
      7,145,6,200
A4 310 DATA 208,251,169,0,141,2,32,141,3,3
      2
48 315 DATA 169,2,141,37,32,169,129
4D 320 DATA 141,3,152,32,0,152,160,0,145,6
      ,200,208
CF 330 DATA 251,238,104,152,32,0,152,238,1
      04,152,32,0
2D 340 DATA 152,238,104,152,32,0,152,169,0
      ,88,24,96
83 350 DATA 133,6,32,45,255,169,160,32,237
      ,253,169,164
42 360 DATA 32,237,253,165,6,32,218,253,16
      9,0,186,232
7A 370 DATA 232,154,88,24,96,0,0,0,0,0,0,0,0
#A 380 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0
```

Program 4: Finder

Be sure to use "Apple Automatic Proofreader" to enter the following program.

```
74 5 REM COPYRIGHT 1988 COMPUTE! PUBLICATI
     ONS, INC. ALL RIGHTS RESERVED.
D1 10 FOR I = 768 TO 774: READ J: POKE I,J
     : NEXT I: DATA 169,0,73,255,133,6,96
37 20 D$ = CHR$ (4): HGR : HGR2 : TEXT : H
     OME : PRINT D$;"BLOAD PRODOS,A$2000,
     TSYS"
96 30 CLEAR :CT = 24448
C4 40 FOR B = 1 TO 4
68 50 IF PEEK (CT) > 0 THEN POKE 769, PEEK
      (CT): CALL 768:AN$(B) = AN$(B) + CH
     R$ ( PEEK (6)):CT = CT + 1: GOTO 50
96 60 CT = CT + 1: NEXT B
62 70 FOR B = 1 TO 4: PRINT "ANSWER ";B;"
     IS "; CHR$ (34);AN$(B); CHR$ (34): N
     EXT B
```

aa



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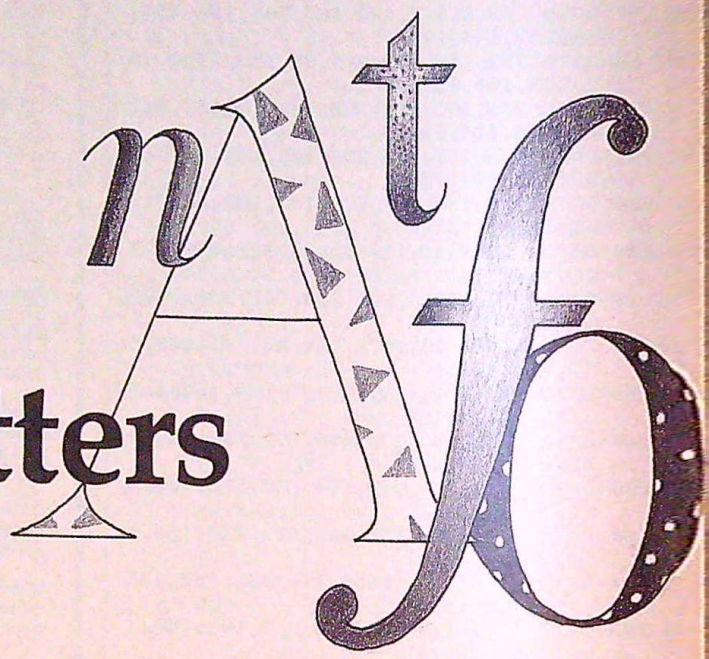

Help Letters Survive!

Horacio M. Arevalo

In this unusual typing game, you help letters cross a dangerous ditch as roaming letter-killers range across the screen. Since you can select the speed of the game, "Help Letters Survive!" can be used by typists of all ages—from children to adults. For all Apple II computers using either DOS 3.3 or ProDOS.

Typing, always an important skill, is necessary in this age of computers. Although things like joysticks and mice abound, most communications between people and computers take place at the keyboard. Without the solid ability to type, and type accurately and quickly, using a computer can become an exercise in frustration.

That's why there is so much typing software around. Scores of commercial programs teach typing on the computer keyboard using a variety of methods. Some are straight-forward tutorials while others are more game-like, giving rewards and issuing penalties.

"Help Letters Survive!" is a unique approach to typing practice. First and foremost, it's a challenging game that's great fun to play. But because you have to type—and type fast and accurately—it's also excellent practice.

Help Letters Survive! doesn't show you which fingers go on which keys, and it doesn't time your typing speed. Neither does it give you controlled typing practice or let you type actual sentences. What it does offer is immense entertainment in a game that you always win.

Type In The Typing Game

Help Letters Survive! comes in two parts, one written in BASIC and the other written in machine language. You'll need to type in both programs before you can play the game.

Program 1, "Help Letters," is an Applesoft BASIC program. To make it almost impossible for typing errors to creep into your listing, use "Apple Automatic Proofreader," the utility found elsewhere in this issue. Type in Program 1 and save it to disk with the filename *HELP.LETTERS*.

Program 2, "HLS," is the heart of the game. Written in machine language, this part of Help Letters Survive! must be entered using Apple Applications' other error-checking utility, "Apple MLX," found in this issue.

You don't have to know anything about machine language programming to type in Program 2. Simply enter and save a copy of Apple MLX version 1.1 to disk, run the program, and answer the prompts that appear at the top of the screen with:

```
STARTING ADDRESS? 6000
ENDING ADDRESS?   65B7
```

After Apple MLX displays the options menu, choose E to enter the program, then type in your starting address. (If you're just beginning to enter HLS, type 6000, the first address in the listing.) Enter the data and save the file as *HLS* to the same disk as Program 1.

Note: It's very important that you save this file as HLS; *that's the filename Program 1 expects to find.*

To play Help Letters Survive!, all you have to do is put the disk containing both programs in the disk drive, then type:

```
RUN HELP.LETTERS
```

and press Return.

Fingers Ready?

Enter a number between 0 and 200 to start the game. By typing in a different number every time you play, you make sure that each game of Help Letters Survive! is different from the last.

The next screen presents Help Letters Survive!'s *parameters*, settings you can easily change to customize the game. Simply press the Y key if you want to change any of the settings (like other questions in Help Letters Survive!, pressing the Return key is the same as entering N for No, the response necessary to proceed). The cursor appears at the topmost setting. Type in a new value (see below) and press Return to go to the next.

DELAY, the amount of time between each letter or asterisk movement, can be between 40 and 255. The higher the number, the slower the letters and asterisks move. You might want to reset this value to a higher number if children are playing Help Letters Survive!.

INIT.TIME represents the time you have to complete each level. The values range from 500 to 1000. The more time you have to finish a level, of course, means that you have a better chance of getting a bonus (the time remaining when you finish a level is translated into the same number of bonus points). Remember, you never lose at Help Letters Survive!—when the timer reaches 0, you immediately go to the next level, without receiving any bonus. The game becomes much harder to play with an initial time of 500.

SOUND indicates whether the game's sound effects are on (1) or off (0).

The default values are:

DELAY	40
TIME	700
SOUND	1

When these values are used and your score is higher than the lowest already recorded on disk (in the file HI.SCORES), your score is saved and the lowest is erased.

The daring letter P attempts to cross a sea of asterisks. If timed correctly, the player will gain points from the character's safe passage.

It's easy to change the default values for Help Letters Survive!. To set them for your particular situation—perhaps for a game played by children—replace the given values with your own in line 40 of Program 1.

Finally, enter your name when the prompt appears (up to ten characters), press Return, and you're playing Help Letters Survive!.

Run, Letters, Run

The game screen for Help Letters Survive! appears, with the level number, time remaining, and current score displayed at the far right. Most of the screen, however, is taken up by the playing field. Letters are ranked at both the top and bottom of the ditch (the rows of dots), and if you watch the screen for a moment, you'll see the letter-seeking asterisks roaming from left to right.

A flashing cursor moves over the letter rows, running from left to right at the top and then from left to right at the bottom. Watch this cursor. Type a letter that appears in either row—when the cursor reaches that letter, it's free to move toward the opposite side of the ditch.

Notice that the key pressed remains active until another one replaces it. In other words, several letters may be pushed into the water with only one keystroke.

When a letter reaches the border, it's replaced by a plus sign, and ten points are added to your score. Letters intercepted by an asterisk, however, are eliminated and no points are awarded.

The timer counts down toward 0 at a pace of one unit of time per cursor movement. When the timer reaches 0, the level ends.

If you release all letters—whether they make it safely across the ditch or not—the level ends and the time remaining is added to your score as a bonus.

The goal of Help Letters Survive! is quite simple. Help letters across the ditch in the least

possible time and avoid the nasty asterisks along the way. It's not easy, but it *is* fun!

Help Letters Survive! includes five levels, each one faster than the one before. Although the time allowed remains constant, the cursor, letters, and asterisks move faster with each level. You'll have to make decisions quickly, especially in levels 4 and 5.

Survival Commands

As you play Help Letters Survive!, you have several commands at your disposal.

Ctrl-A toggles the sound on and off. With the sound off, the game speeds up; otherwise, a significant delay is introduced by the sound effects, either when a letter is moving or when an asterisk drops over it.

Press the **Esc** key to present the Quit option. Typing Q at this point sends you to the High Scores screen (if appropriate) and lets you end the game by typing Y and pressing Return. Hitting any other key lets you continue.

The **space bar** pauses the game. Press any key to resume.

Help Letters Survive! is a game for all ages. Everyone can find it entertaining and educational. And since you can only win and never lose, Help Letters Survive!, it's perfect for endless typing practice. If you're more the competitive type, you can go for the high scores and the chance to make it onto the permanent Help Letters Survive! Hall of Fame.

Program 1: Help Letters

Be sure to use "Apple Automatic Proofreader" to enter the following program.

```
74 5 REM COPYRIGHT 1988 COMPUTE! PUBLICATI
     ONS, INC. ALL RIGHTS RESERVED.
B4 6 HOME : TEXT : VTAB 10: HTAB 13: PRINT
      "COPYRIGHT 1988": HTAB 7: PRINT "COM
     PUTE! PUBLICATIONS, INC."
53 7 HTAB 10: PRINT "ALL RIGHTS RESERVED."
     : FOR X = 1 TO 2000: NEXT
F6 10 REM SAVE HELP.LETTERS
EE 20 HOME :D$ = CHR$ (4):OP$ = D$ + "OPEN
      ":RD$ = D$ + "READ ":WR$ = D$ + "WR
     ITE ":CL$ = D$ + "CLOSE ": PRINT D$"
     NOMON C,I,O"
85 30 VTAB 12: PRINT TAB( 13)"PLEASE WAIT.
     .": GOSUB 450
EE 40 REST = 40:TIMER = 700:SOUND = 1
3E 50 SP = REST:TM = TIMER:MU = SOUND: GOS
     UB 510
56 60 PRINT CHR$ (4)"BLOAD HLS"
95 70 VTAB 22: PRINT TAB( 8)"PRESS A KEY T
     O CONTINUE ";: GET A$: PRINT
8B 80 HOME : INPUT "ENTER SEED NUMBER (1-2
     00) ";A$: IF A$ = "" THEN OP = INT (
      RND (1) * 100): GOTO 100
C6 90 OP = VAL (A$): IF OP < 1 OR OP > 200
      THEN 80
3E 100 FOR J = 1 TO OP:K = RND (1): NEXT
4F 190 POKE 49168,0
3F 200 GOSUB 510
A6 210 B = 24: VTAB 5: PRINT "OPTIONS" TAB
     ( 21)"PRESENT VALUE": FOR J = 1 TO
     40: PRINT "-";: NEXT
4A 220 VTAB 8:D = REST: PRINT "DELAY: (40-
     255)" TAB( 8)"" SPC( D < 1E2)"" SPC
     ( D < 1E3)D
99 230 VTAB 12:E = TIMER: PRINT "INIT.TIME
      (500-1000)" TAB( 8)"" SPC( E < 1E3
     )E
2D 240 VTAB 16:G = SOUND: PRINT "SOUND (0=
     OFF, 1=ON)" TAB( 8)"" SPC( G < 10)"
     " SPC( G < 1E2)"" SPC( G < 1E3)G
03 250 VTAB 22: INPUT "WANT TO CHANGE SETT
     INGS? [Y/N] ";A$: VTAB 22: CALL - 8
     68: IF A$ < > "Y" THEN 340
DB 260 VTAB 8: HTAB 8: INPUT "";A$: IF A$
     = "" THEN VTAB 8: HTAB 8: PRINT SPC
     ( D < 1E2)"" SPC( D < 1E3)D: GOTO 2
     90
09 270 SP = VAL (A$): IF SP < 40 OR SP > 2
     55 THEN 260
9A 290 VTAB 12: HTAB 8: INPUT "";A$: IF A$
      = "" THEN VTAB 12: HTAB 8: PRINT S
     PC( E < 1E3)E: GOTO 320
49 300 TM = VAL (A$): IF TM < 5E2 OR TM >
     1E3 THEN 290
4B 320 VTAB 16: HTAB 8: INPUT "";A$: IF A$
      = "" THEN VTAB 16: HTAB 8: PRINT S
     PC( G < 10)"" SPC( G < 1E2)"" SPC(
     G < 1E3)G: GOTO 335
9A 330 MU = VAL (A$): IF MU < 0 OR MU > 1
     THEN 320
2C 335 GOTO 250
AE 340 POKE 234,TM - INT (TM / 256) * 256:
      POKE 237, INT (TM / 256): POKE 4,M
     U: POKE 5,SP
48 360 VTAB 22: CALL - 868: PRINT "ENTER Y
     OUR NAME: "NA$ SPC( 10 - LEN (NA$))
     "";: INVERSE : PRINT " ": NORMAL :
     VTAB 22: HTAB 18: INPUT "";A$: IF A
     $ = "" AND NA$ < > "" THEN VTAB 22:
      HTAB 18: PRINT NA$: GOTO 390
91 370 IF A$ = "" OR LEN (A$) > 10 THEN 36
     0
04 380 NA$ = A$
C8 390 PRINT CHR$ (7) CHR$ (7) CHR$ (7) CH
     R$ (7): CALL 24576: REM PLAY GAME
87 400 SC = PEEK (24) + 256 * PEEK (23): I
     F SC < = S(10) THEN GOSUB 530: GOTO
      430
72 410 F = (SP = REST) * (TM = TIMER) * (M
     U = SOUND) * ( PEEK (4) = 1): FOR J
      = 1 TO 10: IF SC > S(J) THEN FOR K
      = 9 TO J STEP - 1:S(K + 1) = S(K):
     N$(K + 1) = N$(K): NEXT :S(J) = SC:
     N$(J) = NA$:PT = J:J = 10
5A 420 NEXT : GOSUB 530: VTAB 9 + PT: HTAB
      32: INVERSE : PRINT "<-": NORMAL
74 430 GOSUB 490: VTAB 22: INPUT "DO YOU W
     ANT TO PLAY AGAIN? [Y/N] ";A$: IF A
     $ < > "N" THEN HOME : GOTO 40
61 440 VTAB 22: CALL - 868: END
BC 450 N$ = "HI.SCORES": ONERR GOTO 470
B9 460 PRINT OP$N$: PRINT RD$N$: FOR J = 1
      TO 10: INPUT N$(J): INPUT S(J): NE
     XT : PRINT CL$: RETURN
42 470 PK = PEEK (222): IF PK = 5 THEN PRI
     NT WR$N$: FOR J = 1 TO 10:N$(J) = "
     XXXXXXXXXX": PRINT N$(J): PRINT 0:
     NEXT : PRINT CL$: POKE 216,0: GOTO
     40
9F 480 HOME : PRINT "ERROR "PK" IN LINE "
     PEEK (218) + 256 * PEEK (219): END
```

```
56 490 IF F THEN PRINT OP$N$: PRINT WR$N$:
       FOR J = 1 TO 10: PRINT N$(J): PRIN
       T S(J): NEXT : PRINT CL$:F = 0
15 500 RETURN
CC 510 TEXT : HOME : INVERSE :B = 8: HTAB
       B:B$ = ":                          :":
       REM  23 BLANKS
2D 520 PRINT B$: HTAB B: PRINT ": HELP LET
       TERS SURVIVE! :": HTAB B: PRINT B$:
       NORMAL : RETURN
EB 530 GOSUB 510: PRINT CHR$ (7) CHR$ (7):
       VTAB 8: HTAB 15: INVERSE : PRINT "
       HIGH SCORES": NORMAL : VTAB 10: FOR
       J = 1 TO 10: HTAB 11: PRINT N$(J)
       TAB( 25)"";
18 540 A = S(J): PRINT SPC( A < 10)"" SPC(
       A < 1E2)"" SPC( A < 1E3)"" SPC( A
       < 1E4)A: NEXT : VTAB 5: PRINT TAB(
       10)"YOUR SCORE IS: "SC
1F 550 RETURN
```

Program 2: HLS

For mistake-proof program entry, use "Apple MLX" to type in this program.

```
6000: A9 00 85 18 85 17 A9 01 A4
6008: 85 FB A5 EA 85 E8 A5 ED F6
6010: 85 E9 A5 FB C9 06 D0 01 8B
6018: 60 20 51 60 A5 EB F0 07 07
6020: 20 F5 63 A9 01 D0 EB 20 B8
6028: 53 63 20 BF 64 20 35 65 DE
6030: 20 EA 60 20 C5 61 20 24 E1
6038: 62 20 81 62 20 38 63 20 51
6040: 7E 64 18 A5 FA 65 EF C9 CD
6048: 1E D0 D1 A9 01 85 EB D0 E7
6050: CB A9 00 85 EC 85 19 85 EE
6058: 08 85 06 85 07 85 FA 85 61
6060: 1E 85 CE 85 EF 85 EB 85 B6
6068: CF 20 58 FC 20 26 65 A6 FE
6070: 08 9D B4 65 20 F0 FD A5 EF
6078: EC 0A 9D D2 65 A9 00 9D 82
6080: F0 65 9D 0E 66 A9 A0 20 E2
6088: F0 FD E6 EC E6 08 A5 EC 7C
6090: C9 0F D0 D8 20 8E FD 20 F8
6098: 8E FD AD B4 65 85 D7 A0 B2
60A0: 00 A2 00 A9 AE 20 F0 FD 7A
60A8: E8 E0 1E 30 F6 20 8E FD 30
60B0: C8 C0 13 30 EC 20 8E FD 6E
60B8: A9 A0 20 F0 FD 20 26 65 AB
60C0: A6 08 9D B4 65 20 F0 FD 61
60C8: A5 19 0A 18 69 01 9D D2 C2
60D0: 65 A9 16 9D F0 65 A9 01 BC
60D8: 9D 0E 66 E6 19 E6 08 A5 41
60E0: 19 C9 0F D0 D3 A9 00 85 5A
60E8: 08 60 A5 1E F0 5A A0 00 8E
60F0: BE 36 66 BD F0 65 85 25 94
60F8: 20 22 FC BD D2 65 85 24 29
6100: A9 AE 20 F0 FD BD 0E 66 BF
6108: F0 06 DE F0 65 4C 13 61 93
6110: FE F0 65 BD F0 65 85 25 64
6118: 20 22 FC BD D2 65 85 24 4A
6120: BD B4 65 20 F0 FD C0 00 9E
6128: D0 05 A9 32 20 D9 63 BD D9
6130: F0 65 C9 02 10 06 20 49 40
6138: 61 4C 43 61 C9 15 30 03 43
6140: 20 49 61 C8 C4 1E 30 A8 C5
6148: 60 A9 A0 9D B4 65 BD F0 3B
6150: 65 85 25 20 22 FC BD D2 21
6158: 65 85 24 A9 AB 20 F0 FD 0C
6160: 18 A5 18 69 0A 85 18 90 59
6168: 08 E6 17 A9 01 C5 1E F0 B2
6170: 10 A2 00 A0 01 B9 36 66 AF
6178: 9D 36 66 E8 C8 E4 1E D0 D9
6180: F4 C6 1E E6 FA A9 1E C5 22
6188: FA F0 01 60 A9 17 85 25 05
6190: 20 22 FC A9 08 85 24 20 E4
6198: 80 FE 20 93 65 C5 D8 D4 61
61A0: D2 C1 A0 C2 CF CE D5 D3 B6
61A8: BA B5 B1 B2 00 20 84 FE 20
61B0: 20 3A FF 20 3A FF 20 89 AF
61B8: 64 18 A5 17 69 02 85 17 4F
61C0: A9 01 85 EB 60 A5 09 F0 A4
61C8: 5A A5 1E C9 05 F0 54 A6 BD
61D0: CF BD B4 65 85 FD C5 E7 6F
61D8: D0 49 C9 A0 F0 45 BD F0 A2
61E0: 65 85 25 20 22 FC BD D2 B1
61E8: 65 85 24 A9 20 20 F0 FD 40
61F0: A9 A0 85 D7 BD 0E 66 F0 C2
61F8: 09 DE F0 65 DE F0 65 4C 3E
6200: 08 62 FE F0 65 FE F0 65 BE
6208: BD F0 65 85 25 20 22 FC D7
6210: BD D2 65 85 24 A5 FD 20 41
6218: F0 FD A6 1E A5 CF 9D 36 69
6220: 66 E6 1E 60 A5 CE F0 58 3E
6228: A2 00 BD 31 66 85 19 85 0A
6230: 25 20 22 FC BD 2C 66 85 94
6238: EC 85 24 20 9E 64 C9 AA 20
6240: D0 02 A9 AE 20 F0 FD BD 8C
6248: 2C 66 C9 1D F0 06 18 69 01
6250: 01 4C 56 62 A9 00 9D 2C 4E
6258: 66 85 EC 85 24 BD 31 66 88
6260: 85 19 85 25 20 22 FC 20 D4
6268: 9E 64 85 FD A9 AA 20 F0 4F
6270: FD A5 FD C9 AE F0 04 20 5B
6278: CB 62 60 E8 E4 CE 30 AA C3
6280: 60 A5 CE C9 05 F0 43 20 E7
6288: AE EF A5 9F C9 02 10 3A FF
6290: 20 AE EF A5 9F 4A 4A 4A 6E
6298: 4A C9 02 30 F3 C9 14 10 37
62A0: EF 85 03 85 19 A9 00 85 6C
62A8: EC 20 9E 64 C9 AE D0 E0 91
62B0: A5 03 A6 CE 9D 31 66 85 CE
62B8: 25 20 22 FC A9 00 9D 2C E0
62C0: 66 85 24 A9 AA 20 F0 FD EE
62C8: E6 CE 60 A9 FF 20 D9 63 F2
62D0: A0 00 A5 1E 85 EC C6 EC D6
62D8: 84 FD B9 36 66 85 19 A8 1E
62E0: B9 D2 65 DD 2C 66 D0 49 A7
62E8: B9 F0 65 DD 31 66 D0 41 57
62F0: A4 FD C4 EC D0 0C C6 1E 51
62F8: A9 A0 A4 19 99 B4 65 E6 32
6300: EF 60 A6 FD A9 A0 A4 19 BD
6308: 99 B4 65 B9 D2 65 85 24 6C
6310: B9 F0 65 85 25 20 22 FC DF
6318: A9 AE 20 F0 FD A4 FD C8 B9
6320: B9 36 66 9D 36 66 E8 C8 DD
6328: C4 1E D0 F4 C6 1E E6 EF AE
6330: 60 A4 FD C8 C4 1E D0 A0 7D
6338: C6 EA A5 EA C9 FF D0 12 82
6340: C6 ED A5 ED C9 FF D0 0A 73
6348: A9 00 85 ED 85 EA A9 01 9F
6350: 85 EB 60 A9 00 85 25 20 FB
6358: 22 FC A9 21 85 24 20 80 34
6360: FE 20 93 65 C8 AE CC AE C0
6368: D3 AE 00 20 84 FE A9 04 3E
6370: 85 25 20 22 FC A9 21 85 BF
6378: 24 20 93 65 CC C5 D6 C5 13
6380: CC BA 00 A6 FB A9 00 20 6D
6388: 24 ED A9 08 85 25 20 22 B5
6390: FC A9 21 85 24 20 93 65 EA
```

```
6398: D4 C9 CD C5 BA 00 20 8E F6
63A0: FD 20 8E FD A9 22 85 24 25
63A8: A6 EA A5 ED 20 24 ED 20 9E
63B0: 48 F9 A9 0E 85 25 20 22 53
63B8: FC A9 21 85 24 20 93 65 13
63C0: D3 C3 CF D2 C5 BA 00 20 C2
63C8: 8E FD 20 8E FD A9 22 85 A3
63D0: 24 A6 18 A5 17 20 24 ED 20
63D8: 60 85 03 A5 04 F0 15 8A 84
63E0: 48 98 48 A0 32 A6 03 2C 63
63E8: 30 C0 CA D0 FD 88 D0 F5 08
63F0: 68 A8 68 AA 60 20 3A FF C5
63F8: A9 17 85 25 20 22 FC A9 8A
6400: 08 85 24 20 80 FE 20 93 88
6408: 65 CC C5 D6 C5 CC A0 C3 43
6410: CF CD D0 CC C5 D4 C5 C4 EC
6418: 00 A9 13 85 25 20 22 FC F0
6420: A9 21 85 24 20 93 65 C2 D5
6428: CF CE D5 D3 BA 00 20 8E 29
6430: FD 20 8E FD A9 22 85 24 B6
6438: A6 EA A5 ED 20 24 ED 20 30
6440: 84 FE 18 A5 18 65 EA 85 1A
6448: 18 90 02 E6 17 18 A5 17 6B
6450: 65 ED 85 17 20 53 63 20 9E
6458: 89 64 A9 17 85 25 20 22 C8
6460: FC 20 9C FC E6 FB 38 A5 50
6468: 05 E9 08 85 05 2C 10 C0 41
6470: 20 58 FC A9 00 A5 E8 85 87
6478: EA A5 E9 85 ED 60 A4 05 F4
6480: A2 FF CA D0 FD 88 D0 F8 AD
6488: 60 A9 05 85 EC A2 FF A0 77
6490: FF 88 D0 FD CA D0 F8 C6 C7
6498: EC A5 EC D0 F0 60 A5 19 59
64A0: 0A 85 19 A4 EC 20 71 F8 01
64A8: 85 FD E6 19 A5 19 A4 EC E9
64B0: 20 71 F8 0A 0A 0A 0A 85 B7
64B8: 19 18 A5 19 65 FD 60 A5 E3
64C0: 06 85 25 20 22 FC A5 07 EB
64C8: 85 24 A5 D7 20 F0 FD A5 F5
64D0: 06 D0 1F A5 07 C9 1C D0 77
64D8: 0D A9 01 85 07 A9 16 85 9B
64E0: 06 E6 CF 4C 0C 65 18 A5 F0
64E8: 07 69 02 85 07 E6 CF 4C E7
64F0: 0C 65 A5 07 C9 1D D0 0B AD
64F8: A9 00 85 07 85 06 85 CF D6
6500: 4C 0C 65 18 A5 07 69 02 40
6508: 85 07 E6 CF A6 CF BD B4 D5
6510: 65 85 D7 A5 06 85 25 20 F4
6518: 22 FC A5 07 85 24 A5 D7 38
6520: 49 80 20 F0 FD 60 20 AE 23
6528: EF A5 9F 29 1F C9 1A 10 3F
6530: F5 18 69 C1 60 A9 00 85 74
6538: 09 AD 00 C0 C9 9B D0 35 92
6540: 2C 10 C0 A9 13 85 25 20 F0
6548: 22 FC A9 20 85 24 20 93 2B
6550: 65 DB D1 DD D5 C9 D4 BF 1C
6558: 00 20 0C FD C9 D1 F0 12 16
6560: A9 13 85 25 20 22 FC A9 F4
6568: 20 85 24 20 9C FC A9 01 58
6570: D0 C3 68 68 60 C9 A0 F0 84
6578: BC C9 81 D0 07 A5 04 49 71
6580: 01 85 04 60 C9 C1 30 0A 73
6588: C9 DB 10 06 85 E7 A9 01 B1
6590: 85 09 60 68 85 FE 68 85 71
6598: FF A0 00 E6 FE D0 02 E6 20
65A0: FF B1 FE F0 08 09 80 20 4C
65A8: F0 FD 4C 9B 65 A5 FF 48 B8
65B0: A5 FE 48 60 00 00 00 00 1D aa
```


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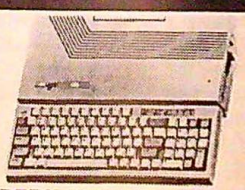

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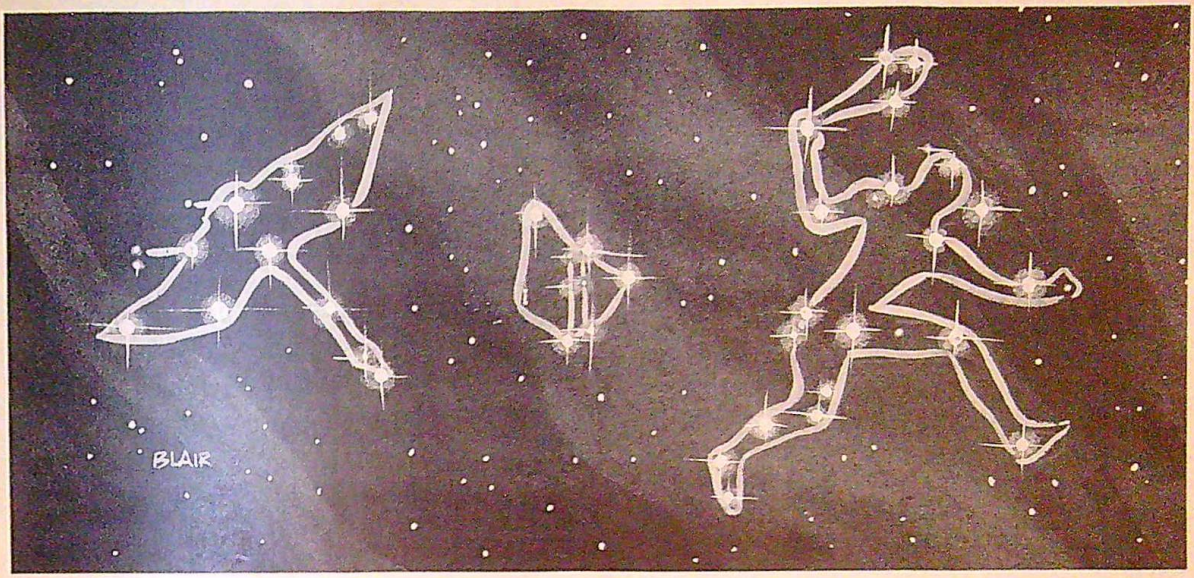


Stars
An Astronomical Simulation

Robert A. Mulford
Apple version by Bill Chin, Editorial Programmer

This fascinating simulation transforms your Apple II into an electronic telescope, letting you study the stars anywhere, at any time. "Stars" shows the locations of 24 major constellations, in both the northern and southern hemispheres, at any hour, on any specified date. It even offers a quiz to enhance study. Works on any Apple II-series computer under both DOS 3.3 and ProDOS.

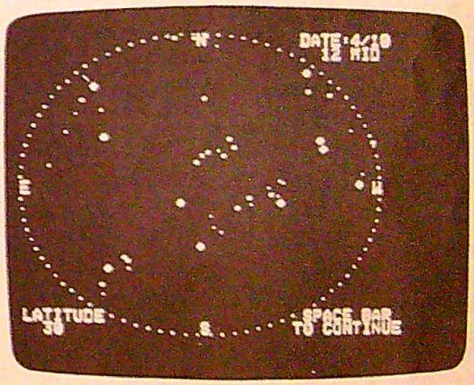
"Stars," a perfect program for both school and home, turns your Apple II into a personal planetarium. It can draw a display of the major star patterns as they appear in the sky, on the date and time you specify, as seen from anywhere on Earth. With Stars, you can test your knowledge of the sky, or simulate the changing star positions during the course of a night or even from month to month. Stars also prints the name of each major astronomical feature as it's presented.

Stars makes it easy to learn the night sky.

Creating Your Own Planetarium

Stars comes in two parts. Program 1, "Stars," is a BASIC program, while Program 2, "STARS .BIN," is written in machine language. Both parts are necessary to run this astronomical simulation.

Type in Program 1 using "Apple Automatic Proofreader," a utility found elsewhere in this issue, to ensure that there are no typing mistakes. When you've finished typing it in, save a copy of Stars to disk using the filename STARS.



Here we gaze upon the night sky from 30 degrees north, at midnight, April 10, 1988.

Program 2 requires a different checking utility, "Apple MLX," for its entry. Even though Program 2 is a machine language program (and in its printed listing form is simply a mass of numbers), you don't have to know anything about machine language to type it in. Just enter and save a copy of Apple MLX to disk, run MLX, and answer the two questions that appear on your screen with the following:

```
STARTING ADDRESS? 8340
ENDING ADDRESS    86A7
```

When Apple MLX displays the options menu, select E to type in the program; then en-

ter the address where you'd like to start. (If you're beginning to enter STARS.BIN, type **8340**, the first address in the listing.) Type in the data and save the file as *STARS.BIN*. Save it to the same disk which contains Program 1. *It's important that you save Program 2 with the filename STARS.BIN, since that's the filename Program 1 looks for.*

See The Sights

When you first run Stars, you'll see a menu with four options: Quit, Simulation, Constellation Study, and Constellation Study with Quiz. For a more detailed explanation of the options, see "Astronomical Options" below. To select any of these, simply type 0, 1, 2, or 3 and press Return.

After choosing one of the four options, you must next specify when and where you wish to view the sky. You can specify the month, day, and time. The year doesn't matter, because on any given date the stars are in the same positions from year to year. The month is entered as a number—January is 1, December is 12.

Enter the time of day as a number between 1 and 12, corresponding to the hour, and then specify a.m. or p.m. (use 12 a.m. for midnight, 12 p.m. for noon). If you choose option 1—the simulation—you must also decide between hourly and monthly updates of sky motions (more about this below).

Your location on the Earth is specified by your latitude. Enter a number between +90 and −90. (Most maps and atlases show latitude.) Stars can draw the sky as viewed from any latitude, even south of the equator. Use a negative latitude for the southern hemisphere, between 0 and −90 (the equator and South Pole, respectively). Users in most of the United States will get a display similar to their local sky by accepting the default latitude of 40 degrees (use 30 degrees for the southern U.S.).

Note: Stars normally accepts only appropriate values. The one exception is if you type in a number, then a letter when entering the values for the month, day, and hour. Stars ignores the letter (which may change the month to January, for instance, if you mistakenly enter a *1*, then type the letter *A*, when you intended to enter *12* for December).

Astronomical Options

When you first run Stars, you must choose one of four options.

- **Option 0,** Quit, returns you to BASIC.
- **Option 1** is a simulation which draws the sky for any specified date and time. Before you enter the date and time, you must specify whether you want the program to show the sky in one-hour, or one-month, increments. When the star map is completed, press the space bar, and Stars automatically recomputes and displays the sky for one hour or one month later. Hold down the Escape key while the stars are being drawn to end the simulation and return to the main menu. It may be necessary to hold down the key for a few seconds.
- **Option 2,** Constellation Study, draws the sky for the date selected, and holds the display on the screen for detailed examination. Pressing the space bar returns you to the menu after the constellations are drawn. This is useful for learning the shapes of the constellations or for examining the appearance of the sky at different seasons of the year. Press Escape to return to the menu while the constellations are being drawn.
- **Option 3** is the Quiz. A star map for the specified date and time is drawn on the screen as the names of the constellations are presented. Then the map is cleared, and as the constellations are redrawn one by one, in random order, you are asked to type in their names. Enter the names carefully and press Return (spelling counts here). You can back up over typing errors by pressing the left-arrow key the appropriate number of times (you can't see a cursor, however). When you give an incorrect answer, the correct name is given, and the quiz moves on to the next question. At the end of the quiz, a score is presented, showing how many of your answers were right. Press the space bar to return to the menu.

The Sky Display

The same display is used for all options. The entire visible sky is shown, with the zenith (the point directly overhead) at the center of the screen, and the horizon represented by a circle around the edges of the screen. The date and time are shown in the upper right corner of the display. This is the same format commonly used for star charts in books and magazines. The sky is represented as it would be seen if you were lying on your back (with north at your head), looking directly overhead. You'll notice that east is to the left: This is the opposite of the way terrestrial maps appear (because we see the sky from "underneath").

The stars are displayed as white points on a dark background. If you specify a time before sunset, the background is still black, but an asterisk appears in the upper left corner of the screen to remind you that the sun is out. (Times for sunrise and sunset are not extremely accurate in Stars, but the program gives you the general idea of when the sun is up.)

Brighter stars appear as larger points on the display. The name of each constellation is shown in the lower right corner of the screen as the constellation is plotted. In a few cases, where a bright star is part of a faint or obscure constellation, the individual star is plotted by itself and its name is given. If a constellation is below the horizon on the date you specified, its name appears only briefly, and the program proceeds to the next constellation.

Stars And The Apple IIGS

Although you can certainly use Stars on an Apple IIGS, you'll probably want to make a change to one of the computer's Control Panel settings before doing so.

The IIGS's greater speed, when compared to the Apple II+, IIe, or IIc, is impressive. You'll notice that with the Control Panel's System Speed set to *Fast*, the stars are drawn much more quickly than if the speed is set to *Normal*.

In the case of Stars, this increased speed can actually be a problem. The stars are drawn so fast, and the constellation names displayed for such a short time, that it may be difficult to tell which constellation name goes with which star(s).

Change the Control Panel settings by pressing Command (Open Apple)-Control-Escape. Select *Control Panel* and then *System Speed*, by pressing Return when those options are highlighted. Alter the speed by pressing the left- or right-arrow key until the desired speed (*Fast* or *Normal*) is displayed.

Program 1: Stars

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
BD 10 REM  COPYRIGHT 1988 COMPUTE! PUBLICA
      TIONS, INC. - ALL RIGHTS RESERVED.
8F 20 HOME : VTAB 9: HTAB 13: PRINT "COPYR
      IGHT 1988": HTAB 7: PRINT "COMPUTE!
      PUBLICATIONS, INC."
7F 30 HTAB 10: PRINT "ALL RIGHTS RESERVED.
      "
77 40 P = 3.141:RD = P / 180:MY = 92:MX =
      122:X2 = MX / 127 * 100
AJ 50 DIM SX(150),SY(150),SM(200),MO(12),C
      $(35),CS(35),ET(12),MT(12),B%(35)
C1 60 POKE 40196,189: POKE 40197,158
84 70 PRINT CHR$ (4);"BLOAD STARS.BIN,A$83
      40": POKE 6,168: POKE 7,131
FB 80 IF PEEK (48896) = 76 THEN PRINT CHR$
      (4);"PR#A$8340": GOTO 100
87 90 POKE 54,64: POKE 55,131: CALL 1002
F7 100 FOR I = 1 TO 12: READ ET(I),MT(I):
      NEXT
E9 110 FOR I = 1 TO 12: READ MO(I): NEXT
F9 120 QZ = 0
64 130 GOSUB 560: HTAB 18: PRINT "MENU":XM
      = 10
49 140 PRINT : PRINT "(PRESS RETURN IF YOU
      ARE NOT SURE)": PRINT : PRINT "0 -
      QUIT"
52 150 PRINT "1 - SIMULATION": PRINT "2 -
      CONSTELLATION STUDY"
09 160 PRINT "3 - CONSTELLATION STUDY WITH
      QUIZ"
42 170 M$ = "ENTER (0-3)":M1 = 0:M2 = 3:DF
      $ = "2": GOSUB 1580:AA = VAL (Z$)
24 180 IF AA = 0 AND Z$ = "0" THEN END
A3 200 ON AA GOTO 210,250,250
2E 210 M$ = "HOURLY OR MONTHLY (H OR M)":M
      1$ = "H":M2$ = "M":DF$ = "H": GOSUB
      1571:A$ = Z$
8A 220 IF A$ = "H" THEN HB = 1:DM = 0: GOT
      O 250
13 230 IF A$ = "M" THEN HB = 0:DM = 1: GOT
      O 250
15 240 GOTO 210
16 250 GOSUB 1200: GOSUB 600
77 260 IS = 0:LB$ = "COMPUTING":CX = 28:CY
      = 22: GOSUB 850
5E 270 READ RA: IF RA > 0 THEN 320
FE 280 IF RA = 0 THEN 400
3B 290 READ LB$:CI = RA * - 1:X = 949:BH =
      0: IF LA > .5 AND CI = 20 THEN 400
63 300 CX = 28:CY = 23: GOSUB 850
4B 310 SM(IS) = 6:SX(IS) = CI:IS = IS + 1:
      C$(CI) = LB$: GOTO 370
69 320 IF AA = 1 AND SM(IS) < 5 THEN X = S
      X(IS):Y = SY(IS):MG = SM(IS): HCOLO
      R= 0: GOSUB 780: HCOLOR= 3:BH = 0
29 330 READ DC,MG: IF BH = 1 THEN MG = 5:
      GOTO 360
0E 340 GOSUB 1440: IF AL < 0 THEN MG = 5:B
      H = 1: GOTO 360
22 350 GOSUB 880: GOSUB 780
B7 360 SX(IS) = X:SY(IS) = Y:SM(IS) = MG:I
      S = IS + 1
92 370 REM
BC 380 IF PEEK (49152) = 155 THEN GOSUB 51
      0: GOTO 130
26 390 GOTO 270
D6 400 SM(IS) = 255: IF AA = 4 THEN AA = 1
45 410 GOSUB 520
4E 420 ON AA GOTO 430,500,910
B8 430 A2 = A2 + HB: IF A2 > 24 THEN A2 =
      A2 - 24:DD = DD + 1:JD = JD + 1
D3 440 MM = MM + DM: IF MM > 12 THEN MM =
      1
08 445 IF DM > 0 THEN DD = D1: IF DD > MO(
      MM) THEN DD = MO(MM)
59 450 IF DD > MO(MM) THEN DD = DD - MO(MM
      ):MM = MM + 1: IF MM > 12 THEN MM =
       1
E1 460 IF DD > MO(MM) THEN 450
86 470 TM = INT (A2) + AN / 60
3F 480 GOSUB 510: GOSUB 1432
87 490 GOSUB 1330: GOSUB 650: GOTO 260
87 500 GOSUB 510: GOTO 130
19 510 RESTORE : FOR I = 1 TO 36: READ A:
      NEXT : RETURN
BC 520 LB$ = "SPACE BAR":CX = 28:CY = 22:
      GOSUB 850
03 530 LB$ = "TO CONTINUE":CX = 27:CY = 23
      : GOSUB 850
24 540 GET A$: IF A$ = " " THEN LB$ = A$:
      GOSUB 850: RETURN
9E 550 GOTO 540
10 560 PRINT CHR$ (4);"PR#0": TEXT
1B 570 HOME : RETURN
FB 580 HPLOT X0,Y0
27 590 RETURN
54 600 HGR2 : HCOLOR= 3: IF PEEK (48896) =
       76 THEN PRINT CHR$ (4)"PR#A$8340":
      GOTO 620
84 610 POKE 54,64: POKE 55,131: CALL 1002
```

```
E2 620 FOR I = 1 TO 180 STEP 2:XØ = MX * S
       IN (2 * I * RD) + MX:YØ = MY * COS
       (2 * I * RD) + MY: HPLOT XØ,YØ: NEX
       T
F3 630 HTAB 18: VTAB 1: PRINT "N": HTAB 1:
        VTAB 12: PRINT "E";: HTAB 35: PRIN
       T "W";
16 640 HTAB 18: VTAB 23: PRINT "S"
D3 650 LB$ = " ": IF TM > MT(MM) AND TM <
       ET(MM) THEN LB$ = "*"
B6 660 HTAB 2: VTAB 2: PRINT LB$
E0 670 VTAB 1: HTAB 28: PRINT "
       ";: HTAB 28: PRINT "DATE:"MM"/"DD
BB 672 A4 = INT (A2): IF A4 = 12 THEN TD$
       = "NOON": GOTO 690
04 674 IF A4 = 24 THEN TD$ = "MID":A4 = 12
       : GOTO 690
C8 680 A4 = INT (A2):TD$ = "AM": IF A4 > =
        12 THEN TD$ = "PM": IF A4 > 12 THE
       N A4 = A4 - 12
58 690 HTAB 29: PRINT "          ";: HTAB 30
       : PRINT STR$ (A4)" ";TD$
05 700 A4 = INT (AN)
B1 710 VTAB 22: PRINT "LATITUDE": PRINT "
           ";: HTAB 3: PRINT LA$
1B 720 RETURN
51 730 IS = Ø
05 740 MG = SM(IS):X = SX(IS):Y = SY(IS):
       IF MG = 255 THEN RETURN
16 750 IF X = Ø THEN 770
60 760 GOSUB 780
3F 770 IS = IS + 1: GOTO 740
88 780 ON MG GOTO 790,820,830,830,840,840
56 790 XØ = X:YØ = Y + 1: GOSUB 580:XØ = X
       + 1:YØ = Y: GOSUB 580:XØ = X + 2:Y
       Ø = Y: GOSUB 580
BB 800 XØ = X + 3:YØ = Y + 1: GOSUB 580
E0 810 XØ = X + 1:YØ = Y + 2: GOSUB 580:XØ
        = X + 2:YØ = Y + 2: GOSUB 580
BD 820 XØ = X + 1:YØ = Y + 1: GOSUB 580
C0 830 XØ = X + 2:YØ = Y + 1: GOSUB 580
20 840 RETURN
80 850 HTAB CX: VTAB CY: PRINT "
         ";: HTAB CX: PRINT LB$;: RETURN
82 880 AZ = 2 * P - AZ:Q = SIN (P / 4 - AL
       / 2) / COS (P / 4 - AL / 2)
E9 890 X = INT ((X2 * Q * SIN (AZ) + X2) *
        1.27)
B1 900 Y = MY - INT (MY * Q * COS (AZ)) -
       1: RETURN
BB 910 IS = 1: GOSUB 600:LB$ = "SORTING":C
       X = 28:CY = 22: GOSUB 850
22 920 I = Ø
6A 930 BH = Ø
5A 940 IF SM(I) = 255 THEN CS(IS) = Ø: GOT
       O 1010
1E 950 CS(IS) = SX(I)
44 960 IF SM(I + 1) > 5 THEN I = I + 1: GO
       TO 940
83 970 I = I + 1: IF SM(I) = 5 THEN BH = 1
DB 980 IF SM(I) < 6 THEN 970
67 990 IF BH = Ø THEN IS = IS + 1
D2 1000 GOTO 930
0F 1010 NC = IS - 1
2D 1020 FOR I = 1 TO NC:B%(I) = I: NEXT
D7 1030 FOR J = 1 TO 5: FOR K = 1 TO NC:L
       = B%( INT ( RND (1) * NC + 1)):T9
       = B%(K):B%(K) = B%(L)
FB 1040 B%(L) = T9: NEXT K,J
51 1050 FOR KS = 1 TO NC:IS = Ø:BH = Ø:JS
       = B%(KS)
34 1060 MG = SM(IS):X = SX(IS):Y = SY(IS):
       IF MG = 255 THEN GOTO 1110
6A 1070 IF MG = 6 THEN CN = X: GOTO 1100
E1 1080 IF CN = CS(JS) THEN BH = 1: GOSUB
       780
21 1090 IF CN < > CS(JS) AND BH = 1 THEN 1
       110
97 1100 IS = IS + 1: GOTO 1060
5A 1110 LB$ = "NAME":CX = 28:CY = 22: GOSU
       B 850
4F 1120 X = Ø:LB$ = "":CX = 28:CY = 23: GO
       SUB 850: INPUT G$
74 1130 IF G$ = C$(CS(JS)) THEN LB$ = "COR
       RECT":CX = 28:CY = 22: GOSUB 850:Q
       Z = QZ + 1: GOTO 1150
02 1140 LB$ = C$(CS(JS)):CY = 23: GOSUB 85
       Ø: FOR I = 1 TO 500: NEXT I
2B 1150 NEXT KS
AF 1160 HPLOT Ø,58 TO 264,58 TO 264,78 TO
       Ø,78 TO Ø,58
7F 1170 HTAB 2: VTAB 9
4C 1180 PRINT "YOU ANSWERED ";QZ;" CORRECT
        OUT OF ";NC;" ":QZ = Ø
BC 1190 GOSUB 510: GOSUB 520: GOTO 130
BF 1200 IF AA = 4 THEN PRINT "STARTING ";
C6 1210 XM = XM + 2: PRINT : PRINT "DATE A
       ND TIME OF SKY DISPLAY"
38 1220 PRINT :M$ = "MONTH (1-12)":M1 = 1:
       M2 = 12:DF$ = "1": GOSUB 1580:MM =
        INT ( VAL (Z$))
B9 1230 M$ = "DAY (1-" + STR$ (MO(MM)) + "
       )":M1 = 1:M2 = MO(MM):DF$ = "1": G
       OSUB 1580:DD = INT ( VAL (Z$))
43 1240 GOSUB 1432:D1 = DD
12 1260 A2 = Ø:AN = Ø:M$ = "HOUR (1-12)":M
       1 = 1:M2 = 12:DF$ = "9": GOSUB 158
       Ø:A2 = VAL (Z$):B$ = " "
EF 1265 A2 = INT (A2)
D0 1270 M$ = " AM OR PM":M1$ = "AM":M2$ =
       "PM":DF$ = "PM": GOSUB 1571:B$ = Z
       $
ED 1280 IF B$ = "PM" AND A2 < > 12 THEN A2
        = A2 + 12
64 1285 IF B$ = "AM" AND A2 = 12 THEN A2 =
       24
7D 1290 TM = A2:AN = (TM - INT (TM)) * 60
FE 1300 M$ = "LATITUDE":M1 = - 90:M2 = 90:
       DF$ = "40": GOSUB 1580:LA = VAL (Z
       $):LA$ = Z$
4C 1310 IF LA = Ø THEN LA$ = "Ø"
CC 1320 LA = LA * RD
C0 1330 FD = TM / 24 + .5: IF FD = > 1 THE
       N FD = FD - 1:JD = JD + 1
3C 1340 DA = DA + FD:D3 = JD - 2451545
BF 1350 T3 = D3 / 36525:T1 = INT (T3)
0B 1360 T2 = (JD - T1 * 36525 - 2451544.5)
        / 36525
41 1370 S3 = 24110.54841 + 184.812866 * T1
       + 8640184.812866 * T2 + .093104 *
       T3 * T3
9A 1380 S3 = (S3 - 0.0000062 * T3 * T3 * T
       3) / 86400:S3 = 24 * (S3 - INT (S3
       ) + (FD - .5) * 1.002737909)
D9 1390 IF S3 < Ø THEN S3 = S3 + 24
A2 1400 IF S3 > 24 THEN S3 = S3 - 24
FB 1410 H3 = INT (S3):M3 = INT (60 * (S3 -
       H3))
63 1420 TG = H3 + M3 / 60
E5 1430 RETURN
55 1432 JD = 2446429.5:DA = DD: IF MM > 1
       THEN FOR I = 1 TO MM - 1:DA = DA +
       MO(I): NEXT
7F 1434 JD = JD + DA: RETURN
40 1440 DC = DC * RD:RA = RA * 15 * RD
4A 1450 T5 = TG * 15 * RD - RA
```

```
FA 1460 S1 = SIN (LA) * SIN (DC) + COS (LA
     ) * COS (DC) * COS (T5)
1F 1470 C1 = 1 - S1 * S1
04 1480 IF C1 > 0 THEN C1 = SQR (C1)
1E 1490 IF C1 < = 0 THEN AL = SGN (S1) * P
     / 2: GOTO 1510
A3 1500 AL = ATN (S1 / C1)
88 1510 C2 = COS (LA) * SIN (DC) - SIN (LA
     ) * COS (DC) * COS (T5)
1A 1520 S2 = - COS (DC) * SIN (T5)
ED 1530 IF C2 = 0 THEN AZ = SGN (S2) * P /
     2: GOTO 1560
06 1540 AZ = ATN (S2 / C2)
1C 1550 IF C2 < 0 THEN AZ = AZ + P
5B 1560 IF AZ < 0 THEN AZ = AZ + 2 * P
E7 1570 HOME : RETURN
14 1571 XM = XM + 1:Z$ = ""
63 1572 VTAB XM: PRINT "
                          ": VTAB XM: PR
     INT M$;: INPUT Z$: IF Z$ = "" THEN
      Z$ = DF$
A7 1574 IF Z$ < > M1$ AND Z$ < > M2$ THEN
     1572
28 1576 RETURN
1F 1580 XM = XM + 1:Z$ = ""
67 1582 VTAB XM: PRINT "
                          ": VTAB XM: PR
     INT M$;: INPUT Z$: IF Z$ = "" THEN
      Z$ = DF$
8A 1584 IF VAL (Z$) = 0 AND Z$ < > "0" THE
     N 1582
55 1590 IF VAL (Z$) < M1 OR VAL (Z$) > M2
     THEN 1582
1F 1592 RETURN
BE 1600 DATA 19,6,19,6,20,5,21,4,21,3,22,3
     ,21,3,20,4,20,4,19,5,18,5,18,6
9F 1610 DATA 31,28,31,30,31,30,31,31,30,31
     ,30,31
4F 1620 DATA -1,"POLARIS",2,89,2
01 1630 DATA -2,"BIG DIPPER"
8F 1640 DATA 11,57,2,11,63,2,11.8,54,2,12.
     2,58,3,12.9,57,2,13.4,55,2,13.7,50
     ,2
F9 1650 DATA -3,"ARCTURUS",14.3,19.5,1
86 1660 DATA -4,"VIRGO",13.4,-11,1,12.6,-1
     ,3,12.9,3,3,13,11,3
BD 1670 DATA -5,"PEGASUS",0.2,15,3,23,14,2
     ,23,28,2,.1,29,2
28 1680 DATA -6,"AURIGA",5.2,46,1,5.9,45,2
     ,5.9,37,2,4.9,33,3,5.4,29,2
03 1690 DATA -7,"ORION",5.9,8,1,5.4,7,2,5.
     75,-2,2,5.6,-1,2,5.45,0,2
94 1700 DATA 5.6,-5.5,4,5.2,-8.5,1,5.8,-10
     ,2
92 1710 DATA -8,"VEGA",18.6,39,1,-9,"CYGNU
     S"
55 1720 DATA 20.7,45,1,20.3,40,2,19.7,45,3
     ,20.75,34,2,19.5,28,3,19.9,35,4
E9 1730 DATA -10,"CANIS MAJOR",6.7,-17,1,6
     .4,-18,2
CC 1740 DATA -11,"AQUILA",19.8,9,1,19.1,13
     .5,3,20.1,-1,3,19.4,3,3,19.1,-5,3
26 1750 DATA -12,"SCORPIUS",16.5,-26,1,16,
     -20,2,15.9,-22,2,15.9,-26,3
24 1760 DATA 17.6,-43,2,16.7,-34,2,17.6,-3
     7,2,16.7,-38,3,17.2,-43,3
8D 1770 DATA -13,"CASSIOPEIA",1.9,63.5,4,1
     .4,60,3,0.9,60.5,2,0.6,56,2,0.1,59
     ,2
3C 1780 DATA -14,"TAURUS",4.6,16,1,4.2,15,
     4,4.4,19,3
89 1790 DATA -15,"CANIS MINOR",7.6,6,1,7.4
     ,9,3
D1 1800 DATA -16,"GEMINI",7.5,32,1,7.7,28,
     1,6.7,25,3,6.6,16,2,6.3,22,3
1F 1810 DATA -17,"LEO"
C7 1820 DATA 10.1,12.5,1,10.1,17,3,10.3,20
     ,2,10.3,24,3,9.8,26,4,9.7,24,3
16 1830 DATA 11.2,21,2,11.2,16,3,11.8,15,2
3C 1840 DATA -18,"SAGITTARIUS",18.3,-30,3,
     18,-30.5,3,18.4,-25,3,18.9,-26,2,1
     9,-30,2
DC 1850 DATA 18.7,-27,3,19.1,-28,3,18.3,-3
     4.5,2
53 1860 DATA -19,"FOMALHAUT",22.9,-30,1
7A 1870 DATA -20,"CARINA",6.4,-52,1
3C 1880 DATA 8.4,-59,2,9.2,-59,2,9.2,-69,2
     ,9.8,-65,3
D7 1890 DATA -21,"VELA",8.2,-47,2,8.6,-54,
     2,9.1,-43,2,9.3,-55,2
A8 1900 DATA -22,"CRUX",12.1,-58,2,12.4,-6
     3,1,12.5,-56,1,12.8,-59,1
47 1910 DATA -23,"CENTAURUS",14.6,-61,1,14
     ,-60,1
9E 1920 DATA -24,"ACHERNAR",1.6,-58,1,0
```

Program 2: STARS.BIN

For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.

```
8340: D8 78 85 45 86 46 84 47 74
8348: A6 07 0A 0A B0 04 10 3E 3A
8350: 30 04 10 01 E8 E8 0A 86 08
8358: 1B 18 65 06 85 1A 90 02 B7
8360: E6 1B A5 28 85 08 A5 29 99
8368: 29 03 05 E6 85 09 A2 08 71
8370: A0 00 B1 1A 24 32 30 02 EB
8378: 49 7F A4 24 91 08 E6 1A 6F
8380: D0 02 E6 1B A5 09 18 69 E9
8388: 04 85 09 CA D0 E2 A5 45 63
8390: A6 46 A4 47 58 4C F0 FD 59
8398: 00 00 00 00 00 00 00 00 9F
83A0: 00 00 00 00 00 00 00 00 A7
83A8: 00 00 00 00 00 00 00 00 AF
83B0: 08 08 08 08 08 00 08 00 8F
83B8: 14 14 14 00 00 00 00 00 51
83C0: 14 14 3E 14 3E 14 14 00 4A
83C8: 08 3C 0A 1C 28 1E 08 00 AF
83D0: 06 26 10 08 04 32 30 00 30
83D8: 04 0A 0A 04 2A 12 2C 00 D7
83E0: 08 08 08 00 00 00 00 00 EE
83E8: 08 04 02 02 02 04 08 00 85
83F0: 08 10 20 20 20 10 08 00 57
83F8: 08 2A 1C 08 1C 2A 08 00 2C
8400: 00 08 08 3E 08 08 00 00 50
8408: 00 00 00 00 08 08 04 00 79
8410: 00 00 00 3E 00 00 00 00 FC
8418: 00 00 00 00 00 00 08 00 31
8420: 00 20 10 08 04 02 00 00 DB
8428: 1C 22 32 2A 26 22 1C 00 A2
8430: 08 0C 08 08 08 08 1C 00 5A
8438: 1C 22 20 18 04 02 3E 00 02
8440: 3E 20 10 18 20 22 1C 00 B5
8448: 10 18 14 12 3E 10 10 00 55
8450: 3E 02 1E 20 20 22 1C 00 80
8458: 38 04 02 1E 22 22 1C 00 72
8460: 3E 20 10 08 04 04 04 00 4B
8468: 1C 22 22 1C 22 22 1C 00 DF
8470: 1C 22 22 3C 20 10 0E 00 75
8478: 00 00 08 00 08 00 00 00 C2
8480: 00 00 08 00 08 08 04 00 F2
8488: 10 08 04 02 04 08 10 00 9C
8490: 00 00 3E 00 3E 00 00 00 53
```

```
8498: 04 08 10 20 10 08 04 00 52
84A0: 1C 22 10 08 08 00 08 00 13
84A8: 1C 22 2A 3A 1A 02 3C 00 82
84B0: 08 14 22 22 3E 22 22 00 E7
84B8: 1E 22 22 1E 22 22 1E 00 55
84C0: 1C 22 02 02 02 22 1C 00 91
84C8: 1E 22 22 22 22 22 1E 00 A5
84D0: 3E 02 02 1E 02 02 3E 00 30
84D8: 3E 02 02 1E 02 02 02 00 BF
84E0: 3C 02 02 02 32 22 3C 00 7B
84E8: 22 22 22 3E 22 22 22 00 91
84F0: 1C 08 08 08 08 08 1C 00 24
84F8: 20 20 20 20 20 22 1C 00 E1
8500: 22 12 0A 06 0A 12 22 00 1F
8508: 02 02 02 02 02 02 3E 00 89
8510: 22 36 2A 2A 22 22 22 00 7F
8518: 22 22 26 2A 32 22 22 00 82
8520: 1C 22 22 22 22 22 1C 00 F9
8528: 1E 22 22 1E 02 02 02 00 0D
8530: 1C 22 22 22 2A 12 2C 00 2A
8538: 1E 22 22 1E 0A 12 22 00 DD
8540: 1C 22 02 1C 20 22 1C 00 A5
8548: 3E 08 08 08 08 08 08 00 66
8550: 22 22 22 22 22 22 1C 00 2D
8558: 22 22 22 22 22 14 08 00 D4
8560: 22 22 22 2A 2A 36 22 00 5A
8568: 22 22 14 08 14 22 22 00 7D
8570: 22 22 14 08 08 08 08 00 88
8578: 3E 20 10 08 04 02 3E 00 D1
8580: 3E 06 06 06 06 06 3E 00 12
8588: 00 02 04 08 10 20 00 00 16
8590: 3E 30 30 30 30 30 3E 00 8E
8598: 00 00 08 14 22 00 00 00 F6
85A0: 00 00 00 00 00 00 00 7F 2B
```

```
85A8: 04 08 10 00 00 00 00 00 B9
85B0: 00 00 1C 20 3C 22 3C 00 24
85B8: 02 02 1E 22 22 22 1E 00 01
85C0: 00 00 3C 02 02 02 3C 00 04
85C8: 20 20 3C 22 22 22 3C 00 A7
85D0: 00 00 1C 22 3E 02 3C 00 F3
85D8: 18 24 04 1E 04 04 04 00 93
85E0: 00 00 1C 22 22 3C 20 1C EF
85E8: 02 02 1E 22 22 22 22 00 39
85F0: 08 00 0C 08 08 08 1C 00 9A
85F8: 10 00 18 10 10 10 12 0C 01
8600: 02 02 22 12 0E 12 22 00 F0
8608: 0C 08 08 08 08 08 1C 00 37
8610: 00 00 36 2A 2A 2A 22 00 C4
8618: 00 00 1E 22 22 22 22 00 E8
8620: 00 00 1C 22 22 22 1C 00 A4
8628: 00 00 1E 22 22 1E 02 02 AA
8630: 00 00 3C 22 22 3C 20 20 49
8638: 00 00 3A 06 02 02 02 00 09
8640: 00 00 3C 02 1C 20 1E 00 92
8648: 04 04 1E 04 04 24 18 00 3D
8650: 00 00 22 22 22 32 2C 00 F5
8658: 00 00 22 22 22 14 08 00 3D
8660: 00 00 22 22 2A 2A 36 00 3A
8668: 00 00 22 14 08 14 22 00 CF
8670: 00 00 22 22 22 3C 20 1C 42
8678: 00 00 3E 10 08 04 3E 00 1B
8680: 38 0C 0C 06 0C 0C 38 00 8F
8688: 08 08 08 08 08 08 08 08 95
8690: 0E 18 18 30 18 18 0E 00 ED
8698: 2C 1A 00 00 00 00 00 00 42
86A0: 00 2A 14 2A 14 2A 00 42 E8
```

88

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Mosquito Madness

Jenny Schmidt

Pesky mosquitoes buzzing loudly in your ears make it hard to concentrate on anything, much less have fun at a picnic. In this maddening machine language arcade game, mosquitoes are the target, and a can of insect repellent is your weapon. For all Apple II–series computers using either DOS 3.3 or ProDOS.

It won't be long. In just a matter of months, it will be mosquito season for most of us. Try to enjoy a picnic when these nasty insects are out—just try. They can drive you insane.

Bug zappers may hum and snap in the background, you may slap at the mosquitoes as long as you want, you can even grab the insect repellent and chase after them. It doesn't matter because in the end you'll get bitten. There are just too many bugs.

That's the scene for "Mosquito Madness," an arcade-action game for the Apple II+, IIe, IIc, and IIGS. You defend your picnic guests from flitting mosquitoes with a can of repellent. Spray and save your guests; miss, and your guests are history.

The Three Parts Of Madness

To play Mosquito Madness, you have to type in three programs. Program 1, "Mosquito," is a short BASIC program that loads the actual game files. Even though Program 1 is short, use "Apple Automatic Proofreader," the error-checking utility found elsewhere in this issue, to help you type in the program without mistakes. Once you have it entered, save it as *MOSQUITO*. It is very important that you use this filename.

Program 2, "MOSQ," is the machine language game itself. It requires the other typing utility found in this issue, "Apple MLX." You don't have to know anything about machine language programming to type in an MLX listing in Apple Applications. Just enter and save a copy of Apple MLX to disk.

Before you run MLX, though, type in these two statements.

```
POKE 104,32
POKE 8192,0
```

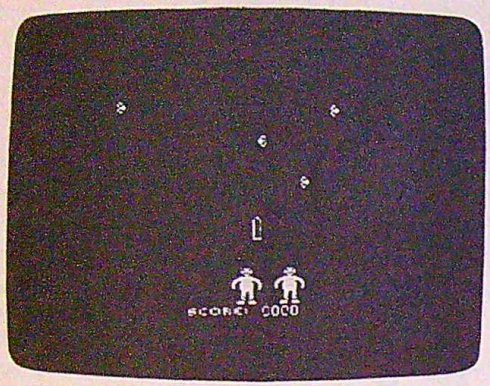
These prevent the data you're about to enter from overwriting MLX. Now, run MLX and answer the questions that appear on your screen with

```
STARTING ADDRESS?  0800
ENDING ADDRESS?    0D1F
```

When Apple MLX displays the options menu, select E to type in the program, and then enter the address where you'd like to start. (If you're just beginning to enter MOSQ, type **0800**, the first address in the listing.) Type in the data and save the file as *MOSQ*. Save it to the same disk which contains Program 1. *It's important that you save Program 2 with the filename MOSQ, since that's the filename Program 1 looks for.*

Program 3, "MOSQ.SHAPES," is a shape table used by the program. It's also in machine language and so must be entered with MLX. Its starting and ending addresses are

```
STARTING ADDRESS?  6000
ENDING ADDRESS?    641F
```



Using a single can of bug repellent, players must shoot down a swarm of mosquitos.

Type it in the same way as you entered Program 2. When you're through, save it to the same disk as Programs 1 and 2, using the filename *MOSQ.SHAPES. Again, it's vital that you save Program 3 with the filename MOSQ.SHAPES, because Program 1 expects that file to be on the disk.*

Watch Those Bugs Drop

You begin your mosquito nightmare when you type

```
RUN MOSQUITO
```

and press Return. After a few moments (while the two machine language files are loaded into memory), you'll see the game screen (see the photo).

Near the bottom of the screen is a can of insect repellent. Below that are your three picnic guests. Soon, the nasty mosquitoes begin darting across the screen. As they do, they drop lower and lower, closer and closer to the guests you're protecting. Once a mosquito gets past your spray can, it attacks one of your guests. Annoyed, the guest leaves your picnic. If all three guests leave, your party's over.

Move and fire the spray can using keyboard commands. Pressing the J key moves the can to the left; pressing the K key moves the can to the right. Hitting the space bar squirts a jet of repellent. Each mosquito you hit adds 25 points to the score at the bottom.

You'll quickly notice that you can't constantly squirt repellent. Once you spray, there's a short delay before you can squirt again. Don't waste your shots. As soon as your three guests have departed, the game is over. Keep your picnic party going as long as you can.

Learn By Example

Mosquito Madness is a good example of an arcade-style game for the Apple II. If you're interested in writing arcade games, you can learn a lot by studying the techniques used in this game. The following is an overview of the game's algorithms and techniques.

The game process can be broken down into four steps: initializing, moving, checking for unusual circumstances, and drawing.

Initializing. The screen is cleared, and the variables controlling the various objects on the screen are initialized. The guests and score are then drawn at the bottom of the screen.

Moving. The keyboard is read to see if the J or K key has been pressed. If either key was pressed, the X-coordinate of the spray can is adjusted.

Attention is next turned to the mosquitoes. The program tries to add a mosquito to the field. One is added when a variable containing a random number equals 0 *and* one of the eight mosquitoes is not in play. (A flag is associated with each mosquito to determine its state. This flag equals 0 when the mosquito is out of play, but equals 1 when the mosquito is in play.)

The mosquitoes are moved by adding to their X and Y coordinates from the *path list*. The path list contains the increments needed to make the mosquitoes move along jerky paths.

Checking. After the mosquitoes have been moved, they're checked to make sure that they have not moved off the screen. The keyboard is read again to check if the space bar is being pressed. If it is, a line is drawn to the mosquito directly in its path or to the top of the screen. A timer is set and decremented throughout the game. The player cannot squirt the repellent again until the counter reaches 0.

Drawing. Drawing is a two-step process. The old objects must be erased, and the new objects must be drawn. Mosquito Madness uses *page flipping* to achieve smooth-looking movement.

Page flipping uses both hi-res screens. All erasing and drawing occurs on the undisplayed or hidden page. When the drawing on the hidden page is completed, it's displayed, and the previously displayed page becomes the hidden page. The process can then be repeated using the newly hidden page.

Order of Shapes in Shape Table

Shape #	Shape
1	Guest
2	Mosquito (right face)
3	Mosquito (left face)
4	Spray can
5	Score
6	Replay
7–16	Numbers 0–9

Mosquito Madness uses an Applesoft BASIC shape table for the game's shapes (listed here in binary form as MOSQ.SHAPES). Two lists of shapes are used, one for each page. The lists contain the shape number and coordinates for each shape (see the table).

During the drawing process, the list of objects that remain on the hidden page are used to erase those on the displayed page. Then the new objects are put in the list and are drawn. Finally, the hidden page is displayed, and the process is ready to start again.

Program 1: Mosquito

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
38 5 TEXT : HOME : VTAB 6: HTAB 12:A$ = "
                          ": INVERSE : PRINT A
     $: HTAB 12: PRINT " MOSQUITO MADNESS
     ": HTAB 12: PRINT A$: NORMAL
D6 10 VTAB 12: HTAB 13: PRINT "COPYRIGHT 1
     988": HTAB 7: PRINT "COMPUTE! PUBLIC
     ATIONS, INC."
87 15 HTAB 10: PRINT "ALL RIGHTS RESERVED.
     "
E0 20 IF PEEK (104) < > 128 THEN POKE 103,
     1: POKE 104,128: POKE 32768,0: PRINT
      CHR$ (4);"RUN MOSQUITO"
F6 30 PRINT CHR$ (4);"BLOAD MOSQ,A$800": P
     RINT CHR$ (4);"BLOAD MOSQ.SHAPES,A$6
     000"
C4 40 CALL 2048
```

Program 2: MOSQ

For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.

```
0800: 20 E2 F3 20 D8 F3 A9 01 44
0808: 85 E7 A9 80 8D 00 15 8D 36
0810: 00 16 A9 00 8D 8D 0C 8D 23
0818: E2 0B 8D E3 0B A8 A2 07 93
0820: 9D CA 0B 9D D2 0B CA 10 55
0828: F7 8D E4 0B 8D E5 0B 85 84
0830: FB A9 60 85 FE A9 02 85 35
0838: FD A9 04 99 00 17 C8 A9 63
0840: 2E 99 00 17 C8 A9 BA 99 3B
0848: 00 17 C8 A2 03 A9 2E 8D 0A
0850: E0 0B A9 00 99 00 17 C8 8C
0858: AD E0 0B 99 00 17 18 69 68
0860: 10 8D E0 0B C8 A9 9E 99 6C
0868: 00 17 C8 CA D0 E4 A9 80 F1
0870: 99 00 17 A9 17 85 FC A9 3D
0878: 40 85 E6 20 43 0C 20 BC 30
0880: 0C A9 20 85 E6 20 43 0C A7
0888: 20 BC 0C A9 46 8D DA 0B 1D
0890: EE 9A 0C AD 00 C0 C9 CB 7D
0898: D0 12 AD DA 0B 18 69 05 89
08A0: C9 8A 90 02 A9 89 8D DA D3
08A8: 0B 4C C0 08 C9 CA D0 10 15
08B0: AD DA 0B 38 E9 05 8D DA 8C
08B8: 0B B0 05 A9 00 8D DA 0B AC
08C0: 20 8E 0C 4A 4A D0 23 A2 29
08C8: 07 BD D2 0B D0 19 9D BA B7
08D0: 0B 9D CA 0B A9 01 9D D2 37
08D8: 0B 20 8E 0C 4A 4A 4A 18 31
08E0: 69 23 9D C2 0B D0 03 CA BA
08E8: 10 DF A2 07 BD D2 0B F0 FD
08F0: 16 10 17 BD C2 0B 18 69 AA
08F8: 02 C9 64 90 07 A9 00 9D 8E
0900: D2 0B A9 64 9D C2 0B 4C 14
0908: E5 09 BD D2 0B 29 40 F0 A2
0910: 57 BD BA 0B 18 69 03 9D 4F
0918: BA 0B AD E4 0B 0A 0A 0A EC
0920: 0A 18 69 2E DD BA 0B B0 ED
0928: DE A0 00 8C 00 17 8D 01 13
0930: 17 A9 9E 8D 02 17 8D 03 6F
0938: 17 A9 17 85 FC 8A 48 20 3E
0940: 9B 0C 20 43 0C A5 E6 49 69
0948: 60 85 E6 20 43 0C A5 E6 47
0950: 49 60 85 E6 68 AA A9 00 7F
0958: 9D D2 0B EE E4 0B AD E4 D1
0960: 0B C9 03 D0 A2 4C 6C 0B 02
0968: 8A 4A 0A 0A 0A 0A 8D DE A6
0970: 0B BD CA 0B 18 6D DE 0B C0
0978: A8 B9 E6 0B C9 05 90 07 65
0980: A9 02 9D B2 0B D0 05 A9 16
0988: 01 9D B2 0B BD BA 0B 18 90
0990: 79 E6 0B 9D BA 0B C8 BD A5
0998: C2 0B 18 79 E6 0B 9D C2 CA
09A0: 0B FE CA 0B FE CA 0B C8 04
09A8: B9 E6 0B C9 80 D0 05 A9 4A
09B0: 00 9D CA 0B BD BA 0B C9 EC
09B8: 88 90 1E A9 00 9D BA 0B 88
09C0: BD C2 0B 18 69 05 9D C2 A2
09C8: 0B C9 64 90 0C A9 9E 9D 4A
09D0: C2 0B A9 40 9D D2 0B D0 5F
09D8: 0C BD BA 0B C9 8C 90 05 0F
09E0: A9 00 9D BA 0B CA 30 03 0E
09E8: 4C EC 08 AD 00 C0 C9 A0 6F
09F0: F0 03 4C C5 0A 2C 10 C0 04
09F8: AD E5 0B D0 F5 A9 0F 8D CB
0A00: E5 0B A9 80 8D DF 0B AD B6
0A08: DA 0B 8D DE 0B EE DE 0B C8
0A10: A2 07 BD D2 0B F0 30 BD 56
0A18: C2 0B C9 79 B0 29 AD DE 85
0A20: 0B DD BA 0B 90 21 BD BA 78
0A28: 0B 18 69 03 CD DE 0B 90 B5
0A30: 16 AD DF 0B 10 03 8E DF F0
0A38: 0B BD C2 0B AC DF 0B D9 1F
0A40: C2 0B 90 03 8E DF 0B CA 8F
0A48: 10 C8 A2 03 20 F0 F6 A9 77
0A50: 00 AE DF 0B 30 4D BD D2 C1
0A58: 0B C9 01 D0 40 8A 48 20 6E
0A60: BC 0C A5 E6 49 60 85 E6 B6
0A68: 20 BC 0C A5 E6 49 60 85 3A
0A70: E6 F8 AD E2 0B 18 69 25 CA
0A78: 8D E2 0B AD E3 0B 69 00 66
0A80: 8D E3 0B D8 20 BC 0C A5 F4
0A88: E6 49 60 85 E6 20 BC 0C 04
0A90: A5 E6 49 60 85 E6 68 AA A3
0A98: A9 80 9D D2 0B BD C2 0B 62
0AA0: 18 69 07 48 AD DE 0B 0A 89
0AA8: AA 8E DB 0B A9 00 2A A8 2C
0AB0: 8C DC 0B 68 8D DD 0B 20 44
0AB8: 11 F4 AD DB 0B AE DC 0B DD
0AC0: A0 78 20 3A F5 A5 E6 C9 C8
0AC8: 20 D0 06 A9 15 85 FC D0 06
0AD0: 04 A9 16 85 FC A2 07 A0 8D
0AD8: 00 BD D2 0B F0 12 BD B2 65
0AE0: 0B 91 FB C8 BD BA 0B 91 6B
0AE8: FB C8 BD C2 0B 91 FB C8 70
0AF0: CA 10 E6 A9 03 91 FB C8 05
```

```
ØAF8: AD DA ØB 91 FB C8 A9 79 E4
ØB00: 91 FB C8 A9 80 91 FB 20 F3
ØB08: 43 ØC A5 E6 C9 20 D0 11 67
ØB10: 2C 54 C0 A9 40 85 E6 A9 93
ØB18: 16 85 FC 20 43 ØC 4C 2F 4E
ØB20: 0B 2C 55 C0 A9 20 85 E6 3D
ØB28: A9 15 85 FC 20 43 ØC AD AC
ØB30: E5 0B C9 0F D0 2B 20 A9 43
ØB38: ØC A2 00 20 F0 F6 A5 E6 94
ØB40: 49 60 85 E6 AE DB 0B AC D9
ØB48: DC 0B AD DD 0B 20 11 F4 13
ØB50: AE DC 0B AD DB 0B A0 78 F5
ØB58: 20 3A F5 A5 E6 49 60 85 C8
ØB60: E6 AD E5 0B F0 03 CE E5 D9
ØB68: 0B 4C 90 08 A9 05 8D 00 26
ØB70: 17 A9 3C 8D 01 17 A9 5A EE
ØB78: 8D 02 17 A9 80 8D 03 17 AA
ØB80: A9 17 85 FC A9 01 8D 8D AB
ØB88: ØC A2 03 20 F0 F6 20 43 96
ØB90: ØC A5 E6 49 60 85 E6 20 8E
ØB98: 43 ØC 2C 10 C0 20 ØC FD 76
ØBA0: C9 CE F0 07 C9 EE F0 03 CC
ØBA8: 4C 00 08 2C 54 C0 2C 51 F7
ØBB0: C0 60 60 51 C0 05 00 00 7A
ØBB8: 04 00 60 51 C0 05 00 00 0C
ØBC0: 04 00 60 51 C0 05 00 00 14
ØBC8: 04 00 60 51 C0 05 00 00 1C
ØBD0: 04 00 60 51 C0 05 00 00 24
ØBD8: 04 00 60 60 51 C0 60 60 B1
ØBE0: 60 60 60 51 60 60 04 00 EC
ØBE8: 04 00 04 00 04 00 04 00 A9
ØBF0: 04 00 04 00 80 00 04 FC 92
ØBF8: 04 FC 04 FC 04 04 04 04 DC
ØC00: 04 04 80 00 00 00 04 00 33
ØC08: 04 00 04 00 04 00 04 00 CA
ØC10: FC 00 FC 00 80 00 04 00 52
ØC18: 04 00 04 FC 04 FC 04 FC 9B
ØC20: 00 FC 00 FC 00 FC FC FC 32
ØC28: FC 00 FC 00 FC 00 FC 00 40
ØC30: FC 04 00 04 00 04 00 04 1C
ØC38: 04 04 04 04 04 04 04 00 4C
ØC40: 04 00 80 A0 00 B1 FB 10 43
ØC48: 01 60 8D 8C ØC C8 B1 FB 56
ØC50: 0A AA A9 00 2A 8D 8B ØC F7
ØC58: C8 98 48 B1 FB AC 8B ØC D4
ØC60: 20 11 F4 AD 8C ØC 0A A8 97
ØC68: B1 FD AA C8 B1 FD 18 69 D9
ØC70: 60 A8 AD 8D ØC F0 08 A9 4F
ØC78: 00 20 01 F6 4C 84 ØC A9 5E
ØC80: 00 20 5D F6 68 A8 C8 4C 7F
ØC88: 45 ØC 4C 4C 4C 4C AD 9A 1E
ØC90: ØC 0A 90 02 49 1D 8D 9A D7
ØC98: ØC 60 60 A2 0A 2C 30 C0 27
ØCA0: A9 14 20 A8 FC CA D0 F5 CB
ØCA8: 60 A2 00 20 8E ØC 90 03 64
ØCB0: 2C 30 C0 A9 0A 20 A8 FC BC
ØCB8: CA D0 F0 60 A0 00 A2 93 6C
ØCC0: A9 B9 20 11 F4 AD E3 0B 62
ØCC8: 4A 4A 4A 4A 20 05 0D A0 56
ØCD0: 00 A2 9A A9 B9 20 11 F4 E4
ØCD8: AD E3 0B 29 0F 20 05 0D C4
ØCE0: A0 00 A2 A1 A9 B9 20 11 3D
ØCE8: F4 AD E2 0B 4A 4A 4A 4A 4E
ØCF0: 20 05 0D A0 00 A2 A8 A9 8B
ØCF8: B9 20 11 F4 AD E2 0B 29 9F
ØD00: 0F 20 05 0D 60 18 69 06 57
ØD08: 0A A8 B1 FD AA C8 B1 FD 41
ØD10: 18 69 60 A8 A9 00 20 5D 12
ØD18: F6 60 0C A0 03 B1 1A 20 84
```

Program 3: MOSQ.SHAPES

For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.

```
6000: 10 00 22 00 39 01 52 01 80
6008: 6B 01 9F 01 0F 02 4E 03 E2
6010: 64 03 73 03 89 03 9F 03 FC
6018: B5 03 CB 03 E1 03 F7 03 2C
6020: 0D 04 09 09 09 09 29 2D 06
6028: 0D 09 09 09 11 1B 1B 1B A9
6030: 3B 1B 3F 1B 1F 1B 1B 13 9D
6038: 09 09 09 29 2D 2D 2D 0D F8
6040: 09 09 11 1B 1B 1B 3B 1B 72
6048: 1B 1B 1F 1B 1B 13 09 09 33
6050: 09 09 29 2D 0D 09 09 09 77
6058: 11 1B 1B 1B 1B 1B 3F 1B 5C
6060: 1B 1B 1B 13 09 09 09 2D B5
6068: 2D 2D 2D 2D 09 09 11 1B 2D
6070: 1B 3F 3F 3F 3F 3F 3F 3F 1F
6078: 1B 13 09 2D 2D 2D 2D 2D 25
6080: 2D 2D 2D 2D 11 3B 3F 1B AA
6088: 3B 3F 3F 3F 1F 1B 3F 17 8D
6090: 2D 0D 09 2D 2D 2D 2D 2D C4
6098: 09 29 35 3F 1B 1B 3F 3F C5
60A0: 3F 3F 3F 1B 1B 37 2D 09 83
60A8: 09 2D 2D 2D 2D 2D 09 09 EA
60B0: 35 3F 1B 1B 3F 3F 3F 3F A5
60B8: 3F 1B 1B 37 29 09 09 2D 63
60C0: 2D 2D 2D 2D 09 09 15 1B 8D
60C8: 1B 1B 1F 1F 1F 1F 1F 1B 82
60D0: 1B 13 09 09 09 29 29 29 FD
60D8: 29 29 09 09 11 1B 1B 1B 70
60E0: 1F 1F 1F 1F 1F 1B 1B 13 7D
60E8: 09 09 09 29 29 09 29 29 0D
60F0: 09 09 11 1B 1B 1B 1F 1F EE
60F8: 1B 1F 1F 1B 1B 13 09 09 E4
6100: 09 29 29 09 29 29 09 09 50
6108: 11 1B 1B 1B 1F 1F 1B 1F F9
6110: 1F 1B 1B 13 09 09 09 29 65
6118: 29 09 29 29 09 09 11 1B 13
6120: 1B 3B 3F 1F 1B 3B 3F 1F 7C
6128: 1B 13 09 09 2D 2D 0D 09 30
6130: 29 2D 2D 09 11 00 00 00 91
6138: 00 29 0D 11 1B 1F 33 0D C0
6140: 29 15 3F 3F 17 0D 29 15 0D
6148: 1B 1F 33 29 0D 11 00 00 06
6150: 00 00 09 29 15 1F 3B 13 75
6158: 29 0D 31 3B 3F 37 29 0D 03
6160: 31 1F 3B 13 09 29 15 00 33
6168: 00 00 00 09 2D 11 3B 1B FA
6170: 17 0D 09 31 1F 1B 33 0D 0F
6178: 09 31 1F 1B 33 0D 09 31 B2
6180: 1F 1B 33 0D 09 31 1F 1B 37
6188: 33 0D 09 31 1F 1B 33 0D 35
6190: 09 31 1F 1B 33 0D 09 31 CA
6198: 3F 3F 37 00 00 00 00 09 BA
61A0: 0D 0D 09 09 0D 0D 09 09 96
61A8: 0D 0D 09 09 0D 0D 09 09 9E
61B0: 09 0D 0D 09 3A 1B 1B 1B FC
61B8: 3B 1B 3B 1B 3B 1B 3B 1B D0
61C0: 1B 3B 1B 1B 1B 3B 1B 1B 0C
61C8: 1B 33 0D 0D 0D 09 0D 09 08
61D0: 09 09 0D 09 09 0D 09 0D 28
61D8: 0D 09 09 0D 0D 09 09 3A 2F
61E0: 1B 1B 1B 3B 1B 3B 1B 3B 46
61E8: 1B 3B 1B 1B 3B 1B 1B 1B B4
61F0: 3B 1B 3B 1B 13 0D 0D 09 21
61F8: 09 09 0D 0D 09 09 0D 0D 88
6200: 09 09 0D 09 0D 09 09 0D 69
```

```
6208: 0D 09 02 00 00 00 00 09 DE
6210: 0D 0D 0D 0D 0D 0D 0D 0D D4
6218: 0D 0D 0D 0D 0D 0D 0D 0D DC
6220: 0D 0D 0D 0D 0D 0D 0D 0D E4
6228: 0D 0D 0D 0D 0D 0D 3A 1B 55
6230: 1B 1B 1B 1B 1B 1B 1B 1B F4
6238: 1B 1B 1B 1B 1B 1B 1B 1B FC
6240: 1B 1B 1B 1B 1B 1B 1B 1B 05
6248: 1B 1B 1B 1B 1B 33 0D 09 3F
6250: 09 2D 09 09 09 2D 2D 09 F6
6258: 09 2D 09 09 2D 09 09 09 47
6260: 09 2D 09 09 2D 09 2D 09 97
6268: 09 2D 2D 09 09 3E 1B 3F E9
6270: 1B 3F 1B 1B 3F 1B 3F 1B A7
6278: 3F 1B 3F 1B 1B 1B 3F 1B 1C
6280: 3F 1B 3F 1B 1B 1B 3F 1B 24
6288: 3F 1B 3F 1B 33 0D 09 2D 5A
6290: 09 2D 09 2D 09 09 09 2D C4
6298: 09 2D 09 2D 09 09 09 2D CC
62A0: 09 2D 09 2D 09 2D 09 09 41
62A8: 09 09 2D 09 3E 1B 1B 3F 3E
62B0: 1B 1B 1B 1B 3F 1B 1B 3F BA
62B8: 3F 3F 1B 1B 1B 3F 1B 1B 29
62C0: 3F 3F 1B 1B 3F 3F 1B 1B 52
62C8: 3F 3F 1B 33 0D 09 2D 09 83
62D0: 2D 09 2D 09 09 09 2D 09 74
62D8: 09 09 2D 09 09 09 2D 09 6A
62E0: 2D 09 09 2D 09 09 09 09 F9
62E8: 09 09 09 3E 1B 1B 3F 1B 58
62F0: 1B 1B 1B 3F 1B 1B 3F 1B 40
62F8: 3F 1B 3F 3F 1B 1B 1B 1B 96
6300: 3F 1B 3F 3F 1B 1B 3F 1B E7
6308: 3F 1B 33 0D 09 09 09 09 F3
6310: 09 09 09 09 09 09 09 09 D6
```

```
6318: 09 09 09 09 09 09 09 09 DE
6320: 09 09 09 09 09 09 09 09 E6
6328: 09 09 1E 3B 3B 3B 3B 3B A5
6330: 3B 3B 3B 3B 3B 3B 3B 3B F6
6338: 3B 3B 3B 3B 3B 3B 3B 3B FE
6340: 3B 3B 3B 3B 3B 3B 3B 3B 07
6348: 3B 13 00 00 00 00 29 2D F0
6350: 3A 1B 33 0D 09 3E 1B 33 DC
6358: 0D 09 3E 1B 33 29 2D 02 FB
6360: 00 00 00 00 29 1A 37 29 70
6368: 1A 17 29 1A 17 2D 06 00 42
6370: 00 00 00 29 2D 3A 1B 33 85
6378: 09 09 1E 3F 13 29 09 1A 27
6380: 1B 33 2D 2D 06 00 00 00 4A
6388: 00 2D 2D 3E 1B 13 09 29 84
6390: 1A 3F 13 09 09 3E 1B 33 D1
6398: 29 2D 02 00 00 00 00 09 88
63A0: 29 1A 3F 13 29 29 1A 1F DC
63A8: 33 2D 2D 1E 1F 13 09 29 5C
63B0: 02 00 00 00 00 2D 2D 1E A5
63B8: 1B 33 2D 2D 3A 1B 13 09 BF
63C0: 09 3E 1B 33 29 2D 02 00 34
63C8: 00 00 00 09 2D 1E 1B 17 4F
63D0: 0D 09 1A 3F 37 0D 09 3E D5
63D8: 1B 33 29 2D 02 00 00 00 02
63E0: 00 2D 2D 3E 1B 13 09 29 DC
63E8: 1A 3B 13 29 09 1A 1B 17 7E
63F0: 29 09 02 00 00 00 00 29 F7
63F8: 2D 3A 1B 33 0D 09 1E 3F 83
6400: 17 0D 09 3E 1B 33 29 2D C1
6408: 02 00 00 00 00 29 2D 3A 0B
6410: 1B 33 0D 09 3E 3F 17 09 8B
6418: 09 1E 1F 13 2D 0D 02 00 A3 aa
```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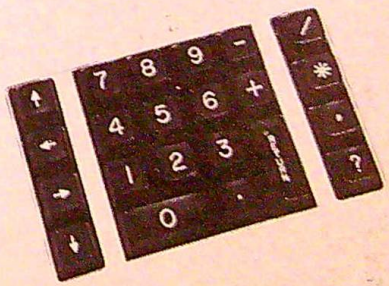

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DOS 3.3 Dates

Mark Russinovich

Keep track of when files were created or modified when you add date stamping capabilities to DOS 3.3 with this simple utility. Complete instructions are provided to format new DOS 3.3 disks with automatic dating. For all Apple II–series computers using DOS 3.3.

Most modern disk operating systems (DOS's) include a file dating feature so that you can immediately see the time of the last changes to the file, or even when the file was created. Apple's ProDOS, for instance, offers this feature when a clock card is installed in an Apple IIe.

Date stamping is extremely useful, for it lets you tell in a glance which version of a program was created or changed last. Staying organized becomes much easier.

Unfortunately, the older of the two Apple DOS's still used, DOS 3.3, does not have date stamping. It's up to you to remember when a file was last changed.

"DOS 3.3 Dates" fixes that problem. With the programs listed at the end of this article, you can insert automatic dating in DOS 3.3.

Date Stamping Utilities

The DOS 3.3 Dates system comes in two parts. The first is a brief BASIC program, while the second is a short machine language routine.

Program 1, "CAT+.BAS," is a very short BASIC program that you'll need to append to your HELLO file (more on that in a moment). Though it's not long, you'll still probably want to use "Apple Automatic Proofreader," the typing utility found elsewhere in this issue, to enter it. Type in Program 1 and save it to disk as *CAT+.BAS*.

Program 2, "CAT+," is the machine language portion of DOS 3.3 Dates. In its form at the end of this article, it looks like a mass of numbers. Don't worry if you know nothing about machine language programming—you can easily enter CAT+ with "Apple MLX," Apple Applications' error-checking entry program for machine language listings.

Enter Apple MLX and save a copy to disk. Now, *before* you even run MLX, type in:

```
HIMEM: 32768
```

and press Return. If you enter CAT+ in more than one sitting, don't forget to type in this command before each MLX/CAT+ session.

Run Apple MLX and respond to the questions which appear on your screen with:

```
STARTING ADDRESS?  9000
ENDING ADDRESS?    915F
```

Once MLX displays the options menu, select E (Enter); then type in the program's starting address. (If you're beginning to enter CAT+, type **9000**, the first address in the listing.) Type in the data found in Program 2's listing and save it as *CAT+* to the same disk as Program 1. *It is important that you save this file with the name* CAT+, *since that's the filename Program 1 looks for and tries to BLOAD.*

This is your master DOS 3.3 Dates disk. You'll use it to initialize all DOS 3.3 disks which offer date stamping in DOS 3.3.

Initialize A Disk

To start, load CAT+.BAS into your Apple's memory. Put a blank disk in the drive and initialize it with the command:

```
INIT HELLO
```

CAT+.BAS has just become this new disk's boot program. In other words, it will automatically run each time you put the disk in the drive and turn on the computer.

If you want to continue to use a familiar HELLO program, just add another line to CAT+.BAS before you load it into memory and initialize disks. The line would look something like

```
130 PRINT CHR$ (4)"RUN filename"
```

where *filename* is the name of your former HELLO program. (Obviously, you'll have to call it something besides *HELLO* in the line and on the disk.)

Next, copy CAT+ to this disk. The best way to do this is to use FID found on the *DOS 3.3 Master Disk*. An alternative is to put the master DOS 3.3 Dates disk in the drive, enter

```
BLOAD CAT+,A$9000
```

press Return, put the newly initialized disk in the drive, and type

```
BSAVE CAT+,A$9000,L$15F
```

Whichever method you use, when you finish you should have two files on disk: HELLO and CAT+. You're ready to try out DOS 3.3 date stamping.

Put the newly created disk in the drive and turn on the computer (or press Open Apple–Control–Reset). In a moment, prompts ask you to enter the current day, month and year. If the date is April 2, 1988, for instance, you would enter 4 for the month, 2 for the day, and 88 for the year.

Dates On The Screen

CAT+ is loaded and run by the HELLO program (and your own boot program if you've made arrangements for it as noted earlier). Catalog the disk—if you haven't added any files besides HELLO and CAT+, you'll see

```
DISK VOLUME 254

 A   003  --/--/--    HELLO
 B   005  --/--/--    CAT+
```

No date is posted for those first two files since HELLO was created with the INIT command and a real date could not be added. However, any files you add from this point on *will* have a date. Any SAVEd, BSAVEd, or RENAMEd file will show the date of its creation or last change.

For example, if you save the file *FOO* with the command

```
SAVE FOO
```

and then catalog the disk, you'll see something like

```
DISK VOLUME 254

 A   003  --/--/--    HELLO
 B   005  --/--/--    CAT+
 A   002  04/02/88    FOO
```

Same DOS As Always

All DOS commands work as if there was no date in front of the filename. To run FOO, for instance, all you'd have to do is type **RUN FOO**.

Changes made to FOO on a different date (assuming you SAVE those changes to disk) mark the program with that new date. The same holds true for binary files (type B files).

However, text files are only stamped with the date when they're created. If you update a text file, delete the old one and then save the new version.

Files copied with a copy program (FID, for instance) are also not date stamped. *Only those files saved to disk with the commands SAVE or BSAVE are date stamped.*

Don't use filenames longer than 21 characters. Although DOS 3.3 allows filenames much longer, DOS 3.3 Dates cannot display more than the first 21 when you type CATALOG (remember, the date characters take up room). The best way to handle this is to rename any file longer than 21 characters *before* it's copied to a dated disk.

After you've booted a new disk with the dating features, you cannot initialize other disks. You must boot a disk with unaltered DOS (use the master DOS 3.3 Dates disk you've set aside for just this purpose), then follow the above procedure to install file dating into your catalog.

Another potential problem is when you save files to a date-stamping DOS 3.3 disk after you've booted an unaltered disk. If you do this, the newly saved files will have dashes instead of dates when you later boot the altered DOS disk. You can RENAME the file (using the same name if you want) to put the current date in front of the filename.

Still more troublesome is the problem you'll encounter if you boot with an altered disk, then load a file from an *unaltered* disk to save to the altered disk. Later, *if you boot with an unaltered disk,* then do a CATALOG on the altered disk, you'll see the two inverse characters *RQ* at the end of the filename. You can't change this; neither can you use that file.

There are two ways to handle this. First, you can boot from an unaltered disk when you're copying files to an altered disk. Second, and probably best, is to only boot from an altered disk when you're using files on an altered disk.

All of these problems point out one caution—use unaltered and altered DOS in combination only with extreme care.

Program 1: CAT+.BAS

Be sure to use "Apple Automatic Proofreader" to enter the following program.

```
74 5 REM COPYRIGHT 1988 COMPUTE! PUBLICATI
     ONS, INC. ALL RIGHTS RESERVED.
4A 10 HOME
90 20 PRINT "CAT+ INITALIZED DISK"
```

```
E2 30 PRINT "COPYRIGHT 1988"
F6 40 PRINT "COMPUTE! PUBLICATIONS, INC."
BE 50 PRINT : INPUT "MONTH: ";MO
A9 60 M1 = INT (MO / 10) * 16 + MO - INT (
      MO / 10) * 10
3E 70 INPUT "DAY: ";DA
7F 80 D1 = INT (DA / 10) * 16 + DA - INT (
      DA / 10) * 10
B8 90 INPUT "YEAR: ";YR
53 100 Y1 = INT (YR / 10) * 16 + YR - INT
       (YR / 10) * 10
0C 110 POKE 249,M1: POKE 250,D1: POKE 251,
       Y1
DF 120 PRINT CHR$ (4)"BRUN CAT+"
```

Program 2: CAT+

For mistake-proof program entry, use "Apple MLX" to type in this program.

```
9000: A0 00 B9 38 91 99 13 AE F3
9008: C8 C0 03 D0 F5 A9 14 8D 37
9010: 17 AE A0 00 B9 3B 91 99 F3
9018: 51 A0 C8 C0 03 D0 F5 A9 20
9020: 1B 8D 03 B2 A0 00 B9 3E 74
9028: 91 99 5A A3 C8 C0 03 D0 1E
9030: F5 A0 00 B9 41 91 99 B9 4D
9038: A3 C8 C0 03 D0 F5 A9 47 9E
9040: 85 FE A9 91 85 FF A9 4F 01
9048: 85 73 A9 90 85 74 60 E8 EE
9050: E8 E8 8E 44 91 8A 18 69 86
9058: 1B AA BD C6 B4 C9 A0 D0 B4
9060: 0B A9 AD 20 ED FD 20 ED BE
9068: FD 4C 6F 90 20 DA FD A9 A4
9070: AF 20 ED FD E8 BD C6 B4 8F
9078: C9 A0 D0 0B A9 AD 20 ED A3
9080: FD 20 ED FD 4C 8A 90 20 14
9088: DA FD A9 AF 20 ED FD E8 64
9090: BD C6 B4 C9 A0 D0 0B A9 7D
9098: AD 20 ED FD 20 ED FD 4C 37
90A0: A5 90 20 DA FD A9 A0 20 62
90A8: ED FD AE 44 91 60 8D 46 C9
90B0: 91 8C 44 91 98 18 69 1B 72
90B8: A8 A2 00 B5 F9 99 75 AA FD
90C0: E8 C8 B5 F9 99 75 AA E8 BF
90C8: C8 B5 F9 99 75 AA C8 AD 2A
90D0: 46 91 AC 44 91 99 75 AA DB
90D8: 4C 59 A0 8D 46 91 68 8D 3A
90E0: 44 91 68 8D 45 91 A9 90 C2
90E8: 48 A9 F1 48 AD 46 91 4C 51
90F0: FF A3 A0 00 AE 9C B3 BD 1C
90F8: C9 B4 99 77 91 E8 C8 C0 59
9100: 1E D0 F4 A0 1D B9 75 AA 74
9108: 99 59 91 88 10 F7 AD 6A 2F
9110: AA 8D 4D 91 AD 68 AA 8D A0
9118: 4C 91 20 DC 03 84 FC 85 41
9120: FD A0 00 B1 FE 91 FC C8 86
9128: C0 12 D0 F7 20 D6 03 AD D9
9130: 45 91 48 AD 44 91 48 60 97
9138: 20 4F 90 4C AE 90 4C DB 42
9140: 90 4C DB 90 FF FF 00 09 4C
9148: 00 59 91 00 FF FF 00 77 6B
9150: 91 00 00 95 91 C2 91 C2 13
9158: 92 FF 00 00 FF FF 00 00 C4 aa
```


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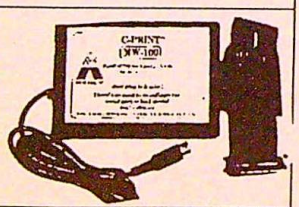

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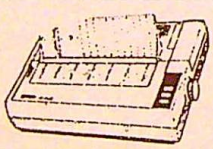

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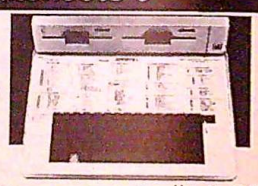

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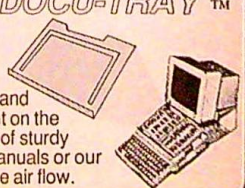

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Wings Of Fury

Mickey McLean
Editorial Assistant

Ah, the tropical breezes and the waving palms of the South Pacific. What a great way to get away from the ice, snow, and freezing rains of winter.

It may be great now, but not in 1944. If you had been in the Pacific then, you'd have found yourself in the middle of World War II, perhaps even serving as a pilot in the United States Navy.

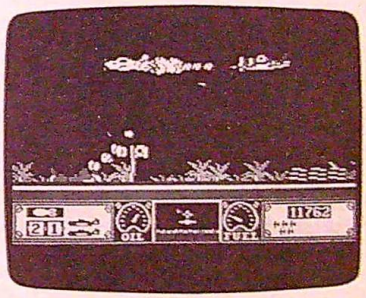
That's exactly who you become in Brøderbund's *Wings of Fury* for the Apple IIe, IIc, and IIGS. You're not island hopping for pleasure in this action adventure game, and you don't want to stay long at these Japanese "resorts."

You are the pilot of an F6F Hellcat based on the USS *Wasp*, an aircraft carrier located somewhere in the Pacific. Your mission is to seek out and destroy enemy-held islands, destroyers, and torpedo planes, along with pesky Zeros that always seem to end up on your tail.

No Flight Sim Here

This is not a flight simulation game. It's an arcade-style sea and air battle. Players who are accustomed to flight-simulator joystick controls will have to make an adjustment. In *Wings of Fury*, pushing the joystick left or right gives your Hellcat full throttle in that direction. To climb or dive, move the joystick up or down as you push the stick in the same direction your plane is moving. Shoving the joystick straight up stalls the plane, and moving it straight down (the full throttle climb position on flight simulators) makes the Hellcat go into a stall dive.

The plane travels only on a straight line, which means that the aircraft carrier and all targets are on the same line of flight. The only other maneuver available besides climbing and diving is turning the plane 180 degrees. Simply reverse the horizontal direction of the joystick. Be careful, though, because the plane tends to lose altitude while turning.



This Hellcat pilot has a smoking Zero on the run. Note the destroyed barracks at lower left and the still-working anti-aircraft gun blazing away at the lower right. The small white shapes beside the barracks are enemy soldiers.

Once you boot the game on your Apple II, the computer will ask you to select a level of difficulty. You choose one of seven ranks, from Midshipman with only one island to attack, to Captain with four islands and two ships to take on. After successfully completing a mission, you'll receive additional orders. And after successfully completing several missions, you'll get a promotion and an extra Hellcat.

The screen includes several game displays. Your Hellcat's control panel is at the bottom, and shows the type and number of weapons available, number of Hellcats left, oil pressure, fuel level, game score, and number of Zeros shot down. At the top is the main game window, which is a side view of your aircraft, the targets, and enemy fighters. If you climb, however, the screen gives you a much wider side view of the surrounding area. In the center of the control panel is a three-dimensional view out your Hellcat's windscreen. This view contains a flashing white cursor which serves as a horizon indicator. A red arrow lights up here, warning you of an attacking Japanese torpedo plane.

Take Off!

To start a mission, you first select weapons for your Hellcat. You have a choice of thirty 100-pound bombs, which can be used on island barracks and machine gun dugouts; fifteen 5-inch rockets, which are needed to destroy large anti-aircraft guns; and one torpedo, which is used to sink enemy destroyers. Torpedoes can only be used after all of the ship's guns have been disabled. The Hellcat is also equipped with three .50 caliber machine guns on each wing, which can be used to shoot down enemy aircraft and to strafe islands.

After selecting weapons, it's time to taxi down the carrier runway, take off, and begin the mission. It's important to use full throttle and climb immediately after takeoff.

Different approaches to enemy targets are needed depending on the type of weapon you're using. When you've got bombs under your wings, you must start high so you can dive toward the target, releasing the bombs directly above the object; then you must quickly climb to avoid crashing and to evade enemy fire. Rockets must be deployed at an angle well ahead of their targets. Torpedoes have to be released when the enemy ship is well in view when you're flying low over the water. Get too close, though, and you'll crash into the destroyer.

Once a target—such as a bar-

racks or dugout—has been hit, Japanese soldiers scatter in an attempt to rearm the island. You must then use your machine guns to strafe the island, leaving bodies in the sand. If you don't get all of the soldiers, the guns you previously put out of commission will be reactivated.

On Your Tail

While trying to complete your missions, Japanese fighter planes (Zeros) will try to shoot you down or lead you over enemy fire. The key to getting the Zeros before they get you is to get behind them. Once a Zero trails you, it's next to impossible to shake it off and get into position to shoot it down. Your only recourse at that point is to return to the carrier and time your next takeoff so that you'll be in the best position to shoot it down.

When you do have the advantage, the three-dimensional view helps you track the Zeros' flight. Should one get the drop on you, the Hellcat seems to have greater speed than the Zero while climbing or diving, which helps you avoid its gunfire as you scamper back to the carrier.

One thing to keep in mind, especially while being chased or while chasing a Zero: Never turn the Hellcat while flying over enemy fire. This usually results in serious damage to your plane. When your plane has been hit, it begins to throw smoke, and the oil pressure starts dropping. When the oil pressure becomes dangerously low or the fuel level nears empty, a red warning light appears on the gauge, reminding you that it's time to head back to the carrier.

After all of the forces on an island have been destroyed and an enemy ship has been hit with a torpedo, the enemy flag disappears or the ship sinks, and a victory message scrolls across the bottom of the screen. If that was the last objective of your mission, the message also tells you to return to the carrier for further instructions.

Once a Zero gets behind you, it's impossible to shake off.

Snagging The Wire

Returning to the carrier sounds simple, but it isn't. One of the most difficult maneuvers in *Wings of Fury* is landing on the carrier deck. All approaches must be made against the wind, which is always from the right. To make matters worse, the carrier constantly rises and falls in the water. You must find the carrier in the three-dimensional view, line up the horizon indicator with the deck, and, at the precise moment, stall the plane. It must drop so that it hooks one of the four arresting cables on the deck. Drop too quickly, and you'll crash into the end of the carrier. Come in too high, and you'll have to turn around and try again—which can be difficult when a Zero is tailing you or if your plane is seriously disabled. Carrier landings are trying tasks for real Navy pilots, and Brøderbund should be commended for making this both realistic and a difficult part of the game.

After the successful landing, you can refuel and repair your Hellcat, receive more instructions, choose new weapons, and take off again.

Disturbing Sounds

The game employs very few sound effects. There is no roar of the plane's engine or howl as the plane begins a crash-ending descent. Bomb, rocket, and torpedo explosions and the machine guns' fire are the only dramatic sounds. The only other noticeable (and disturbing) sound is a high-pitched squeal heard when an enemy soldier has been hit and tumbles into the air.

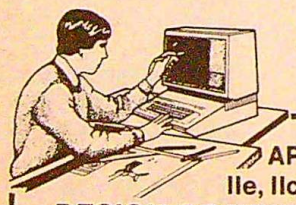
The graphics are better than average for an arcade-style game. This is most evident when the detailed Hellcat and Zero make their turns. Bomb explosions are not very dramatic, especially when compared to rocket attacks that light up the sky. Plane crashes are well done, visually. When crashing on land or a ship, the plane skids, smokes, and then explodes. When your plane meets its doom over the ocean, it hits the water, floats momentarily, and then sinks.

Wings of Fury can be frustrating at first. Completing missions, shaking off Zeros, and landing on the carrier are all difficult. In my experience, however, my timing improved after several sessions with the game, making it more enjoyable. Although my ability improved, the game still remained a challenge—even after weeks of playing. Much of this is due to the seven levels of difficulty, for the missions get progressively longer and the opponent gradually becomes more aggressive.

Brøderbund did an admiral job of transferring the actions of a Hellcat fighter pilot to this arcade-style game. Even though an actual Hellcat couldn't carry thirty 100-pound bombs, you must remember that this is first and foremost a *game*, not a simulation. Exploding and sinking targets are as realistic visually as the Apple II allows (sometimes too realistic).

Parents should note that, since this game depicts war, it can be violent, especially in the strafing of enemy soldiers with machine gun fire. It should also be noted that Japanese-Americans may not be amused with the sometimes graphic recreation of events.

Wings of Fury
Apple IIe, IIc, IIGS (IIe requires extended 80-column card); joystick required; color monitor recommended.
Brøderbund
17 Paul Dr.
San Rafael, CA 94903 $34.95



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Maniac Mansion

Keith Ferrell, Features Editor

A good software game is like a house of many rooms. Different screens and levels bring surprises and challenges. In the best software games, the rooms don't wear out their welcome; even frequently visited screens retain a certain charm.

With *Maniac Mansion*, Lucasfilm Games has created that house of many rooms, both literally and figuratively. The game is set in an ultimate house of terror—the residence of a mad scientist and his deranged relatives, along with assorted aliens, creatures, and ghoulish gizmos. There is evil in this house and the prospect of painful death for any trespassers.

And somewhere deep in the mansion's bowels, Sandy Pantz, a teenage cheerleader, is held prisoner. Her fate is in the hands of the evil Dr. Fred, who intends to use a machine to "suck her brains out." Sandy's only hope is her boyfriend, Dave Miller, and the band of teens Dave gathers to help free Sandy and bring an end to Dr. Fred's plans for world domination.

Horror And Humor

Lucasfilm has taken the classic (if campy) teenagers-against-the-house-of-horror scenario and transformed it into an innovative (if campy) game, one that preserves the charm of its sources while never forgetting that it *is* a game. There are scary moments here, with characters facing the prospect of untimely and unpleasant ends, but it's all leavened with a dose of humor.

Part of the game's success stems from its similarity to a motion picture. To enhance the motion picture feel, there's even an opening teaser, set "twenty years ago today."

Game play itself is simple; it's the scenario and setting that are complex. You must assemble a team of three teenagers—one of whom is Dave—and penetrate Maniac Mansion. Control is by joystick or arrow keys, with a point-and-click interface that contains a selection of verbs such as *Walk to Use*, *Pick Up*, and so on. Click on the verb; then place the cursor over the destination and click again.

You control one teenager at a time. As the game evolves, different members of the team are in different areas of the house, acting independently to achieve a common goal: the rescue of Sandy. At the same time, though, there are instances when it would be nice to move all three team members simultaneously, especially early in the game. As it is, you must click on one teenager, move him or her to the destination, then return to move the others.

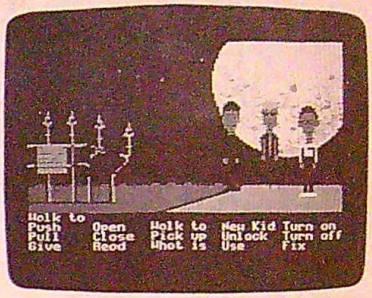
In this insanely intricate game, three teenagers try to rescue one of their own from the clutches of evil Dr. Fred and his brain-sucking machine.

Team members are selected from six teens: Bernard, the cowardly physicist; female punker Razor; Jeff, a surfer; Syd, who's a rock musician; Wendy, who wants to be a novelist; and Michael, a photographer. Their particular talents are required at various places in the house, making team selection an important part of game success.

Full House

Once inside the mansion, it quickly becomes clear that this is no ordinary house. Every room is filled with objects that work and which affect the game.

If there's a tape player in a room, odds are there's a tape somewhere else in the house. Bring the two together and you might get a surprise. Radios and television sets can be turned on, lamps lighted or extinguished, refrigerators opened, secret panels discovered. Lucasfilm's game designers have stuffed this house with tools, implements, weapons, food and beverages, vehicles and fuel, working plumbing (and beings using it), and more. Place the cursor atop an item and click on *What Is* for information about it. Many items may be taken along with a character; an inventory line shows what's in the active character's possession.



Outside the ominous mansion, you and your friends contemplate the adventure that lies ahead.

The house also has residents. Not only is there Dr. Fred, the mad scientist whose machine has designs on Sandy's brain, but there are also Fred's relatives and henchmen. There's a talented tentacle in residence whose hunger must be satisfied and a nurse who takes a definitely different approach from Clara Barton's.

Further enhancing the game's motion picture feel, the relatives and Dr. Fred are occasionally revealed through cutaways, self-contained scenes with which the player does not interact but which have a bearing on the game's play. You might, for example, be investigating a room when the screen cuts away to Cousin Ed emerging in search of a midnight snack. Pay attention to the cutaways; your character's life may depend on it.

Dungeons and Dooms

The mysteries of Maniac Mansion are not easily solved; the challenges are overcome only with great ingenuity. More than once, I maneuvered my characters into dead ends, losing them to the virtually escape-proof dungeon. Other times, I managed to bring the entire house (not to mention several miles of surrounding countryside) to a ghastly end—hardly the sort of liberation Sandy had in mind.

Maniac Mansion is a colorful game, with a setting that functions as a major character. The animation suits the subject matter. The characters move like teenagers, all elbows and knees. Faces carry a sort of gawky dopiness not unlike that of celluloid teenagers in the face of horror.

While it doesn't take long to become familiar with how *Maniac Mansion* is played, its documentation is perhaps too brief. The manual doesn't mention, for example, the use of the Open Apple key as the click button when playing the game by arrow keys. Keyboard play is noticeably slower than joystick play.

The interface is clever and effective, but some shortcuts could have made repeat play more convenient. I doubt if anyone can master the mansion's mysteries in one or even a few attempts. This is a game you must come back to. After a few sessions, though, you acquire a familiarity with some of the rooms and the ways in which their objects can be used to gain access to other areas of the mansion.

Although the game can be saved at various stages on blank, formatted disks, I would have preferred a *Been There* button. Such a button, revealed only after a room has been mastered, would hasten progress through familiar areas, letting you spend more time deeper in the house as you search for Sandy and a means of rescuing her.

On the other hand, this is an interactive game that changes a little bit depending on the team you assemble and the path you have them pursue through the house. Different characters may be able to accomplish different things with some of the mansion's artifacts.

Maniac Mansion brings together a variety of disparate elements and combines them into a gaming experience as well integrated as any I know. There is storytelling and interactivity, graphics and animation, sound effects and mystery. By making the setting a major character in the experience and by modeling the game on a somewhat corny, familiar genre, Lucasfilm Games has produced seamless computer entertainment.

Teenagers unite! Sandy needs your help!

Maniac Mansion
Apple IIe, IIc, IIGs. Requires 128K; joystick optional.
Lucasfilm Games
Distributed by Activision
2350 Bayshore Frontage Rd.
Mountain View, CA 94043
$34.95

Trust & Betrayal

Fred D'Ignazio

People have come to expect great things from software designer Chris Crawford. The creator of such games as *Eastern Front 1941* and *Balance of Power* is in a position similar to Michael Jackson after his mega-hit "Thriller." People have stopped comparing them with other artists and have started comparing them with themselves. With Chris's newest entry, *Trust & Betrayal*, it looks like he is right on course.

The New Shepherd

The opening graphics are stunning: the computer screen dims, stars appear and begin to twinkle, then a planet comes hurtling toward you. This is the planet Lamina, only 135 years after a nuclear war has delivered a knock-out blow to its civilization. Lamina whirls away and up comes its moon, Kira. Kira is where we play our game.

You bargain and battle with Eeyal, the iconic language Crawford developed especially for Trust & Betrayal. *It's unique, and a big part of the game's high quality.*

After Kira spins off, up comes another figure, a shadowy, catlike creature known as a *Ripi*—one of the seven species that inhabit Kira. This isn't just any Ripi, it's Siboot, the founder of a new Kiran civilization based on the telepathic language Eeyal. Siboot was the first of four eeyal-speaking Shepherds who ruled Kira after the Laminan holocaust. Now the fourth Shepherd, Feslym, has died, and it is time for a new Shepherd to take his place.

Are you Shepherd material? How is your telepathy? You'll soon find out, for as the game opens you are cast as Vetvel, a Jomkar of uncertain age and gender who (like other members of the species) looks like a cross between a lynx and a haystack.

Vetvel and his (or her) six fellow acolytes are candidates to become the new Kiran Shepherd. The way to become the new Shepherd is to acquire a full arsenal of telepathic auras. The auras come in three flavors—Tanaga (fear), Katsin (trust), and Shial (love). The first acolyte who accumulates eight auras of each type will become Kira's new Shepherd.

Wheeling And Dealing

The road to shepherdship is relatively simple. You and the other six acolytes spend your days sitting home killing time or hoofing it to each other's houses to bargain and gather information. Your primary goal when you visit another acolyte's house is to find out how many auras the other acolytes have.

The game has three levels of difficulty and three levels of length. In the Easy-Short game, you begin by knowing one set of auras (either Tanaga, Katsin, or Shial) for each of the other acolytes.

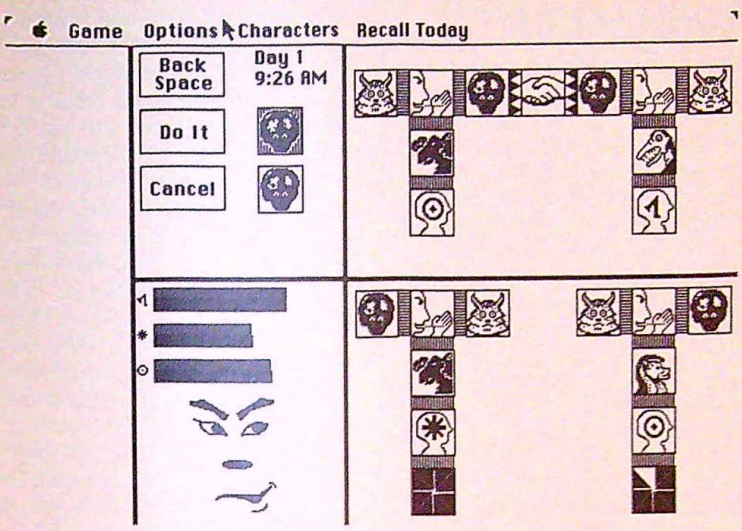
When you visit another acolyte's house, you make a deal—the other acolyte will tell you someone else's aura count if you reveal an aura count which you already know.

The Land Of Auras

A clock at the top of the game board ticks away the day as you go from house to house making deals. At the end of the day (8:00 p.m.), you must return to your house to prepare for combat. The screen darkens to represent night, and you fall asleep and enter a dreamlike Land of Auras where you telepathically battle another acolyte to win an aura.

Your goal at night is to obtain the auras you're lacking—in one or more of the three categories. To do this you must attack a fellow acolyte. Your strategy is based on the relative power of each type of aura: The Tanaga aura (fear) always beats Katsin (trust), Katsin defeats Shial (love), and Shial wins out over Tanaga.

You must look for an acolyte who has a surplus of the aura that you seek. If the acolyte's aura count for that type aura is higher



Trust & Betrayal's iconic language is well represented in this screen, which shows what has been said, and to whom.

than the two remaining types of auras, then he or she will choose that aura to defend against your attack. To win, you must attack with the aura that defeats his or her aura.

Eeyal

The medium you use to bargain and battle with is Eeyal, a telepathic language represented in icon (picture) blocks on the Macintosh screen. The language is entirely pictorial. You and your fellow acolytes are pictured in the little blocks along with actions and emotions which you express and which are expressed by the other acolytes.

During daylight hours the Macintosh screen is divided into five boxes. On the left is your pool of legal Eeyal words and expressions (represented as a stack of picture blocks). The top-center box is a status box that tells you what actions are available, the time of day, and whom you are visiting.

The top-right box is filled by your current Eeyal sentence as you construct it, square by square, with Eeyal picture blocks. The bottom-center box contains simple bar graphs and a face whose expression reveals the other acolyte's reaction to what you've just said. The bottom-right box contains the sentence the other acolyte has constructed and sent, via Eeyal, back to you.

When you first browse through the manual accompanying *Trust & Betrayal*, you might be a little intimidated by the number of picture blocks, or icons, in the language. You needn't worry. There's a narration box which automatically translates sentences back and forth when you first get started. Also, when you move the mouse pointer over any picture box and press the button, a word or words appear to represent the picture on the box.

It's remarkable how quickly you become familiar with the pictures and the words they represent. After only a couple hours playing the game, I turned the narration box off and only occasionally peeked under the pictures to check on the words. Lastly, it's impossible to mis-speak yourself in Eeyal—the language editor won't let you.

Visual Databases

Trust & Betrayal has several unique features that make playing it a joy. First, the Eeyal language, in addition to acting as a means of communication between yourself and the other players, is also a built-in game master and game bookkeeper. The cumbersome aspects of some computer games and most board games are eliminated. You effortlessly glide from acolyte's house to acolyte's house without worrying about going through mazes, collecting supplies, saying magic words, or whatever.

As you conclude deals, you have three visual databases which you can consult to size up your current situation: The first is a characters chart, which shows your auras and all the other characters' known auras. This chart also shows you the location of all the acolytes, including you, so you can plan whom you'll visit next as well as keep an eye on everyone as they skulk about. The second visual database is a Recall Today chart, which reminds you of whom you've betrayed, to whom you have made promises (not to attack or not to betray), who has made promises to you, and who has betrayed you. The third database is a picture and thumbnail sketch of each acolyte, complete with up-to-the-second news on whom he or she likes, trusts, or distrusts.

Don't Mess With Chris Crawford!

Another unique feature are the game's random events. These occur while you are on your way from one acolyte's house to another's. Suddenly the screen changes and some zany character appears or some scene unfolds which, on the surface, has very little to do with your quest to become Kira's new Shepherd.

But don't be fooled. These random events, just like everything else in the game, can play a subtle but decisive role in shaping the game's outcome. How you act toward an apparently minor character or some simple but thoughtless act you take may affect other characters' images of you and their willingness to bargain with you or trust you.

This is especially true when you bump into Chris Crawford, the game designer himself. Chris appears frequently in the game's early stages as a digitized head-and-shoulders image and a caption box. What he says may sound off the wall or irrelevant, but it's good to pay close attention.

Chris's random appearance is a clever way of introducing an advisory function—an intelligent Help command which comes to your rescue even before you realize

you need it. In a way, he's your guardian angel. So listen to his advice, even if it's couched in sentences such as *Psst! Hey keed! Hey keed!* or *Psst! Come here, dummy!*

When my eight-year-old son and I played *Trust & Betrayal*, we made the mistake of not taking Chris seriously, and we responded to his advice with the reply: *Buzz off!* I asked Chris about the effect of this response in a phone interview, and he advised my son and me to be more careful. "Don't forget I'm the designer of the game," he said. "This is my chance to play at being God. You've heard the expression 'It's not nice to fool with Mother Nature?' The same is true in my game: Don't mess around with Chris Crawford. It could land you in a heap of trouble."

Read Before Playing

A message appears on the screen at the beginning of each new game, saying: *Warning! Persons who play this game without reading the rules and the novella are wasting their time.* This is a little harsh, but it is good advice.

Packaged along with the game and the manual is a 40-page novella which sets the stage for the game. The novella may never qualify as great literature, but it is an effective device for introducing you to the people and history of the Laminan moon, Kira. And it is the only real background material you'll have to wade through the adventure.

The game itself is exceedingly spare in details of place, action, events, and atmosphere. It is almost as if you are playing in a vacuum, with the exception of the frequent random events which descend upon you. The real richness of the game lies in the imaginative mental picture you develop from reading the novella and in the complex relationships you forge with the six other acolytes as you vie with them to become the new Shepherd of Kira.

Trust & Betrayal
512K Macintosh with 800K disk drive
Mindscape
3444 Dundee Rd.
Northbrook, IL 60062
$49.95

Math and Me

Carol S. Holzberg

Math and Me is a terrific new educational program for children ages 3–6. Designed and published by Davidson and Associates, *Math and Me* contains 12 elementary number and math activities—games almost—that blend colorful graphics, sound, musical reinforcement, and visual rewards. Billed as your child's first math program, *Math and Me* entertains as it teaches basic math concepts.

I invited my usual tester of children's software—my 4½-year old daughter—to put the program through its paces.

Where'd The Color Go?

Math and Me comes on a 5¼-inch disk, although you can swap it for a 3½-inch disk if you have a UniDisk or Apple 3.5 disk drive. The swap process means, however, that you'll be without the program for a while, since you must mail the 5¼-inch disk to Davidson (the company's customer support department claims that replacement disks are mailed the same day yours is received). The biggest advantage of the smaller disk is that it's almost kid-proof, a big plus in a classroom.

We first tried *Math and Me* on an Apple IIe with a digital RGB color monitor. Unfortunately, the program appeared in a drab monochrome gray. The color problem is probably peculiar to the digital RGB color monitor. Composite color monitors work fine. To make sure the program delivered on its advertised color, we continued on an Apple IIGS equipped with the analog AppleColor RGB monitor. On the IIGS, the graphics were bright, crisp, and colorful.

One of the first things you do in *Math and Me* is type in the user's name. Depending on their age, children may have trouble here. Adult help may be needed. Even an older child may find that pressing the Shift key to capitalize the first letter of his or her name is a daunting task. *Math and Me* could do well to preprogram an uppercase first letter for the name (or even all letters, regardless of the position of the Caps Lock key) to avoid unnecessary frustration on the part of the youngest players.

The program next offers a sound option. Teachers using *Math and Me* in a classroom might want to turn off the sound so that children can practice math skills without involving their classmates. (Sound can also be turned on or off while the program is in play simply by pressing the S key.)

Children interact with *Math and Me* through the keyboard or the mouse. The program keeps it simple—arrow keys move the pointer, and the space bar or Return key selects the highlighted choice. The mouse is more appropriate for older children who have the required manual dexterity. Just move the mouse pointer to the activity icon of your choice, and click.

Math and Me *contains 12 elementary number and math activities—games almost—that blend graphics, sound, musical reinforcement, and visual rewards.*

The Escape key has several functions that depend on your location in the program. If you press Escape while playing a game, you return to the game selection screen. If you're already at the selection screen, Escape takes you to the main menu, and if you're already at the main menu, the key calls up the printer setup menu. By configuring the program to work with your particular printer, interface card, and printer slot, you can print out a Certificate of Excellence to reward your child for a job well done.

A Dozen Games

The main menu offers four subject areas: Shapes, Numbers, Patterns, and Addition. Selecting a subject's box calls up that subject's game screen where you'll find three games to help build early math skills. Four subjects × three games = a dozen activities.

My playtester started with the Numbers subject, and chose Game 2 (the balloon icon). While the games are sequential, with each one building on the skills and concepts learned in the previous activities, children won't have any trouble playing the games out of sequence.

Game 2 of Numbers is an exercise in counting. It presents four colorful monkeys, each sitting in a numbered (1–9) hot-air balloon at the bottom of the screen. Familiar objects—apples, perhaps—appear at the top of the screen. Children count the objects and select the balloon with the appropriate numeral. If their answer is correct, the balloon floats to the top of the screen with a flourish of sound and music. If the answer is incorrect, the program prompts the player to try again. On the third attempt, the correct answer is given. After eight or nine turns at counting numbers, the Numbers game screen returns. My assistant handled this one without difficulty ("Hey mom, this one's easy.").

She picked Game 1 next. This is a simple counting game that teaches or reinforces counting from one to nine, in sequence. The first screen shows one clown; one "beep" sounds; the word *one* appears; and, the number 1 flashes on the screen for just a moment. At the bottom of the screen, there are four numbers. The child must count the objects on the screen and select the box containing the appropriate number. Correct answers are rewarded with sound and the appearance of the ever-present *Math and Me* monkey. Each subsequent screen adds another object until nine ladybugs appear. My playtester took this game in stride ("Hey mom, this one is a real cinch.").

The third game in Numbers is a higher-number/lower-number game. This game required some explanation on my part before my assistant could play on her own. The screen shows a monkey standing ready to crank a blank box. At the top of the screen is the question *How many ballons in the box?* At the bottom of the screen is a grid of nine numbers in sequence. First, I read her the sentence. She then selected one of the numbers by clicking on it with the mouse. A clue appeared onscreen: *Less than 4.* She selected 2. Another clue appeared: *More than 2.* She pressed 3. The monkey responded by turning the crank on the box and playing "Pop Goes the Weasel." At the end of the tune, three balloons appeared on the screen.

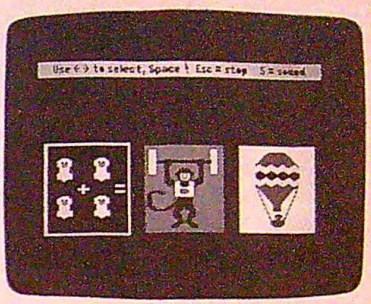
My tester is unable to read, but it took her hardly any time to recognize less and more and respond appropriately. She was able to play the game on her own very quickly. She gave this one a thumbs up ("It's fun.").

My playtester (my daughter) is unable to read, but it took her hardly any time to recognize the concepts of less and more, and respond appropriately. She gave this part of Math and Me *a thumbs up.*

Weight-Lifting Monkeys

The three remaining subject areas in *Math and Me* each presented another three games.

Shapes, the easiest area, offers three simple games using a circle, square, triangle, and rectangle. Children learn how each shape is formed and how its name is spelled in Game 1. Game 2 asks them to match the shape that appears at the top of the screen with one of four shapes appearing in hot-air ballons at the bottom of the screen. Game 3 is an unusual-looking sizing activity. A weight-lifting monkey tries to loft a barbell. Before he can, though, the child must select the correct size shape to match the one one on the side of the bar bell. Only then can the monkey lift the weight. My veteran game tester dispensed with Shape rather quickly. When queried, she said the games were too simple! Younger children, however, will find Shapes easy to play and very enjoyable. In the process they'll learn how to distinguish one shape from another.



Each area of Math and Me *offers three different colorful games from which kids can choose.*

Patterns' three games proved to be more of a challenge than those of Shapes, but my assistant handled them with ease. Game 1 asked her to complete a missing pattern, Game 2 offered a chance to fill in the missing number in a sequence (with a xylophone as reference), and Game 3 used the now-familiar hot-air balloons to help her fill in the missing number in a four-number sequence.

The most difficult subject area is undoubtedly Addition. The three games here will give your child practice in adding objects. My playtester found all three activites somewhat difficult, but she was able to complete two of them with a lot of help from me and some handy paper clips to aid in counting. Game 1 introduces the concept of addition by displaying sets of objects in an addition problem. Their sum is always a number from two to nine. The paper clips (or toothpicks, or crayons, or anything else that's handy) were helpful in counting out the objects and summing their totals. Game 2 is another exercise in adding. A monkey appears with a bar bell. One side of the bar bell contains an equation. The other side is blank. The child must choose the correct answer to solve the equation so that the monkey can lift the bar bell. Game 3 will prove challenging even to a 6-year-old. It involves solving an addition problem before four rising balloons reach the top of the screen.

One, Two, Three...

Overall, my tester (daughter) really enjoyed this program. She appreciated its nonthreatening challenges

and beamed with pride every time she selected correct answers. We returned to it again and again.

Math and Me will give your young children a strong foundation in math, and it's use of frequent positive reinforcement will go a long way in building up their confidence.

Math and Me
Davidson and Associates
3135 Kashiwa St.
Torrance, CA 90505
Apple IIe (with extended 80-column card and 128K), IIc, IIGSGS, and Laser 128; color monitor; 5¼-inch disk drive or 3½-inch disk drive (comes with 5¼-inch disk that can be swapped for a 3½-inch disk)
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"both highly educational and fun to play" ST World, May 1987

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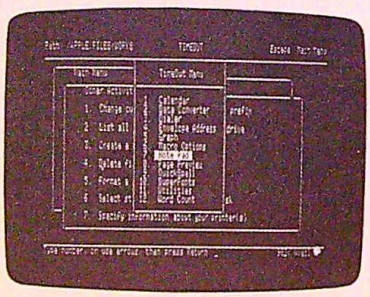
The Timeout Series

Gregg Keizer, Editor

AppleWorks may be the most popular program for the Apple II line, but it isn't perfect. Although the integrated package handles the major chores—word processing, database management, and spreadsheet analysis—it can't do everything. That's why an entire Apple II software publishing niche is devoted to remedying *AppleWorks'* faults. Programs like *ReportWorks* and *AutoWorks*, and template packages like *HelpWorks*, *1040Works*, and *SchoolWorks* (in fact, if it has the suffix *Works*, it's probably an *AppleWorks* add-on) interact with or require *AppleWorks*. A slew of other programs will take *AppleWorks* data—whether it's words, information, or numbers—and do everything from creating graphs to laying out a newsletter.



By pressing Open Apple–Escape, a pull-down menu appears, offering several useful options.

The market for productive *AppleWorks* add-ons doesn't seem to be slacking off, even if reported sales for the program itself are. To many *AppleWorks* users, anything that makes their work with the program easier and more efficient is worth a look, and is usually worth the money.

A lot of *AppleWorks* aficionados are getting excited about a series of add-ons called Timeout, from Beagle Bros. Perhaps better known for its outstanding Apple II programming utilities, Beagle's foray into the applications arena is impressive. Timeout—seven *AppleWorks* enhancements sold separately—covers some of the usual and some of the not-so-usual *AppleWorks* add-on categories.

What sets these add-ons apart from almost every other, though, is that they work from *within AppleWorks*, acting as if they've been a part of the integrated package all along, rather than some Johnny-come-lately slapped on as an afterthought.

The Timeout applications work only with *AppleWorks* version 2.0 or higher. If you've had *AppleWorks* for some time, you'll have to upgrade to 2.0. Frankly, Timeout is one of the best reasons to upgrade *AppleWorks*.

Enough Time(out) For Everyone

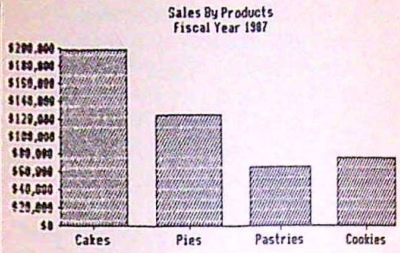
The Timeout series offers these seven enhancements to *AppleWorks*:

- *Timeout Graph*, a graph creator that uses data from the *AppleWorks* spreadsheet ($89.95).
- *Timeout QuickSpell*, a spelling checker that accesses an 80,000-word dictionary ($69.95).
- *Timeout SuperFonts*, which adds Macintosh-style fonts and styles to *AppleWorks* word processor documents ($69.95).
- *Timeout UltraMacros*, a macro language program that, among other things, lets you record keystrokes and mouse movements for later replay ($59.95).
- *Timeout SideSpread*, an adjunct to the *AppleWorks* spreadsheet that allows for sideways printing of long worksheets ($49.95).
- *Timeout FileMaster*, which controls file and disk maintenance (including fast loading and saving of a ramdisk) from within *AppleWorks* ($49.95).
- *Timeout DeskTools* is a collection of desk accessories—appointment calendar, note pad, dialer, clock, word counter, and more ($49.95).

As you can see, list prices for several of the Timeout programs are in the range of stand-alone packages. Buying the entire set will be beyond many user's pocketbooks.

Pricey they may be, but in most cases, the packages are well worth the money. The Timeout series add-ons are easy to use (in many cases, reading the manual is unnecessary to handle the basics), they take care of some of the most glaring deficiencies in *AppleWorks*, and they interact with *AppleWorks* perfectly.

Adding a Timeout add-on to



COMPUTE!'s Apple Applications
March/April 1988

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AppleWorks For Everyone/Chris Van Buren
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*Basketball Sam & Ed/Rhett Anderson and David Hensley, Jr.
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The IIGS

New Vistas: Hot Games For The Apple IIGS/Gregg Keizer

AppleWorks is a straight-forward affair. *AppleWorks* must be modified (only once, no matter how many Timeout applications you use) and the location of the Timeout files must be specified.

Although you can place a Timeout enhancement on the *AppleWorks* disk itself, it's really only practical to do that if you're using just one in the series. When you have two or more of the add-ons at your disposal, the best place to put them is on another disk in the second drive. This disk is probably also used for *AppleWorks* data: You'll have to give up some room for your files to the Timeout applications.

It's not a problem if you're using 3½-inch disks or a hard disk, but it can certainly be troublesome when you're running *AppleWorks* and Timeout from 5¼-inch disks. Even if you have two 5¼-inch drives, you may be in for some disk swapping with Timeout.

One suggested modification to the general Timeout installation procedure would be to let you keep the Timeout enhancements on separate disks. This would prevent some of the disk crowding. At present, you must keep all of the Timeout files on the same disk (the one exception, thank goodness, is that QuickSpell's huge 160K+ main dictionary can be stored on another disk).

The Timeout programs can also be loaded from disk into memory, assuming you have extra memory in your IIe, IIc, or IIGS. This cuts down on disk access and makes programs respond much faster. It also means you'll have less room for those huge files you've been creating.

An even more interesting idea is to copy the Timeout files to a ROM disk. Several boards that transform a RAM card into a ROM disk are now available for the IIGS, for instance, from such manufacturers as Checkmate Technologies and Applied Engineering. Since the Timeout applications are not copy-protected, you can copy them to a ROM disk (or ramdisk) easily. Tucked away in a ROM disk, they become available as soon as you run *AppleWorks*.

Graphs On Time

It's just not possible to take an in-depth look at all seven Timeout add-ons in one review (but look for a feature-length article on Timeout and other *AppleWorks* enhancement software in a future issue of Apple Applications). Instead, let's peek at the three most significant add-ons.

Timeout Graph is the most expensive of the seven add-ons. It's also one of the most impressive. Here's how it works.

From an *AppleWorks* spreadsheet file, you call up *Graph*—as you call up any Timeout program—by pressing Open Apple-Escape and selecting it from the resulting menu. A list of Graph's seven main options appears at the bottom of the spreadsheet screen. Select any one of these and the appropriate submenu is substituted. You can quickly return to the main list by pressing Escape.

The first option, Type, lets you select the style of graph—bar, line, XY, pie, stacked bar, area, or high-low. Choose one and you return to the main list where you'll pick Data to select up to seven sets of data from the spreadsheet. Because the normal spreadsheet commands are still active, you use the arrow keys (perhaps in conjunction with the Open Apple key) to select cells or groups of cells as data ranges. Use the View option at any time to see the graph's progress—the

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graph is drawn quickly, especially when you've made the program memory-based.

The Option selection on *Graph*'s main list lets you add legends and titles, change format, overlay a grid, and scale numbers in all of the *AppleWorks* spreadsheet forms. The File option allows for saving the last-drawn graph's specifications to disk, linking it with the spreadsheet file. Unfortunately, you can only save one graph specification per spreadsheet.

Once the graph is completed, you can print it in one of three sizes, although only in black and white since *AppleWorks* itself doesn't allow for color printing. You can also print the graph to disk as a double-hi-res picture file. Later, you could load that file into a paint program like Baudville's *816/Paint* or Beagle's own *Beagle Graphics*, and then enhance the graph with additional artwork and even print it in color.

The Timeout add-ons take care of some of the most glaring deficiencies in AppleWorks.

Timeout Graph is perfect for making relatively simple and clean graphs quickly and painlessly. Its biggest selling point is that it can be called on while you're working with *AppleWorks*, which means you don't have to quit *AppleWorks* and then load a stand-alone graphing program to draw a graph. It also means that you can return to the spreadsheet file itself, make some changes to your data, run *Graph* again, and see the effect in just moments.

Graph's ease of use and flexibility, however, come at a price. It's not as powerful as similarly priced graphing applications—PinPoint's *Graphic Edge* in particular. You can't add artwork (although you can import a double-hi-res picture file and use it as a background for your graph), nor can you use anything other than the built-in fonts that *Graph* provides. The one graph-specification limit per spreadsheet file forces you to recreate separate types of graphs—bar and stacked bar, or pie and bar, for instance—when you want multiple-graph viewpoints of the same data.

Even with these limitations, *Timeout Graph* is an excellent program. The documentation is thorough and clear, for the most part, the program is easy to use (even for *AppleWorks* novices), and it offers the basics necessary for business graphics.

Time For Great Type

One thing that always marked an *AppleWorks*-produced document, in the past, was its print. Even *Appleworks*' proportionally-spaced print looked less than professional. It's small and nothing close to near-letter quality.

That was fine for letters to close friends, or office memos to yourself, but if you wanted to impress someone with the appearance of the printed word, *AppleWorks* wasn't the program to use.

Timeout SuperFonts changes that. This add-on lets you print any *AppleWorks* word processing file using a variety of fonts and styles, turning plain documents into something identical to Macintosh-produced text.

Like *Graph*, *SuperFonts* requires you to alter *AppleWorks*. You then place the program and its font files on a disk. The more font files you copy to your Timeout applications disk, the more varied are your font choices. The flip side is that the font files quickly eat up disk space, especially if you're using 5¼-inch disks.

With *SuperFonts* ready and its fonts safely tucked away, you can run *AppleWorks* and compose your document normally. You can even use the Control-B and Control-L key combinations (and the super- and subscript Printer Options commands) with *SuperFonts*.

To format the document, you load fonts and add style commands. All commands are defined by enclosing characters with the < and > symbols. Style commands include such things as italics, outline, shadowed, and inverse; load font commands specify a particular font and size. You can cut

down on keystrokes when entering commands if you use a macro program to define the most frequently used.

Load font commands must appear at the top of a document, before any printer options or text. Up to 64 load font commands may be used in a word processor file, although that's unlikely. Once loaded, you can change fonts by issuing a change font command, which is simply the number of the font enclosed by < and >.

Printing is also enchanced, so that once you format your document and call *SuperFonts* with the Open Apple–Escape key combination, you're able to print in three modes—draft, standard, and high quality. When you print at the highest quality, however, *SuperFonts* loads the font *twice* as large as you specified and then reduces that font for maximum resolution. If you plan on using High print quality with Geneva 12 point, for instance, you'll get the best results if you have both the Geneva.12 and Geneva.24 font files where *SuperFonts* can find them.

You can even print at 50-percent reduced rate, and on the ImageWriter, print at a one-to-one ratio for perfectly circular circles and graphics in correct proportion.

SuperFonts also allows for inserting hi-res or double-hi-res pictures within documents, again, with a command issued in the word processing file. If you have *Timeout Graph*, for example, you can save a graph as a double-hi-res graphic and then load it into a word processing document for enhanced printing. Pictures created in such programs as *Dazzle Draw* can also be loaded directly into a document.

SuperFonts is a welcome addition to *AppleWorks*. Since it's called from within the program, it's instantly accessable. The quality of the print is excellent, and makes you think you have a Macintosh hidden inside your Apple II. Selecting text for various styles, however, is not Mac-simple. That lies, of course, with *AppleWorks* as much as anything, since the program doesn't support a mouse and pull-down menu interface. You can't select text, for instance, then change its style. Instead, you have to enter commands. When you're formatting a document extensively, it gets cumbersome.

Of course you can't see the effect of your changes as you make them on the screen. The best you can do is print to the screen with *SuperFonts* (make sure you set Display in the Apple IIGS Control Panel to Monochrome), although this shows you only small chunks of an entire page on the screen.

No single Timeout application, with the possible exception of UltraMacros, *surpasses the power found in stand-alone programs.*

Time To Automate

Another significant member of the Timeout series is *UltraMacros*, billed as the most powerful macro program for *AppleWorks*. A full-featured macro program, *UltraMacros* modifies *AppleWorks* when it's installed and creates an additional application called ULTRA.SYSEM that runs automatically when you boot from ProDOS (run this file instead of *AppleWorks* from the IIGS Finder or Program Launcher, or from the generic Apple II Desktop).

UltraMacros includes a number of reserved macros that are always available, ranging from deleting the character under the cursor (Solid Apple-Delete) to changing the case of a character (Open Apple-: or Open Apple-;) to typing the current date (Solid Apple-"). Other defined macros are set up in sample word-processor-format files on the *UltraMacros* disk. Although several of these files are examples only, others can be compiled with the *UltraMacros* Macro Compiler, then saved as the default set.

Best of all, however, is *UltraMacros'* ability to record your keystrokes (even mouse movements) as a macro. Press Open Apple-X, assign the macro a key, and type away. This is, by far, the easiest way to generate a macro. Novices to macros and their power will find this the perfect introduction. In only a few moments, for instance, you can define a macro to enter your entire return address simply by pressing two keys.

UltraMacros power doesn't stop there, though. Experienced macro programmers can build macros with the more than 50 available commands, some quite sophisticated. IF-THEN-ELSE logic commands are offered, as are ones that can CALL a machine language program or PEEK a certain memory location.

Extras in *UltraMacros* include a screen saver which blanks the screen after a specified time and mouse capabilities for *AppleWorks*.

Time Well Spent

The Timeout series is a major breakthrough for *AppleWorks* owners. Although no single Timeout application, with the possible exception of *UltraMacros*, surpasses the power found in stand-alone programs, their insertion into *AppleWorks* itself makes that an almost trivial limitation. The flexibility of Timeout lies in your ability to call them almost instantly while working in *AppleWorks*. *AppleWorks* bills itself as an integrated package. With Timeout's spelling checker, macros, graphing, fonts, desk accessories, and more, *AppleWorks* can live up to that claim for some time to come.

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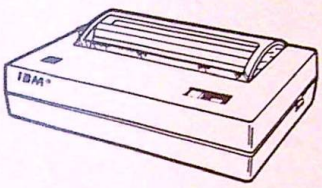

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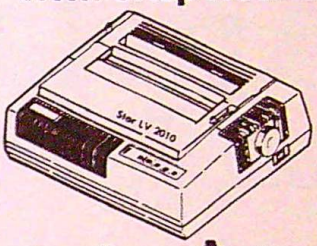

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Apple MLX

Machine Language Entry Program

Tim Victor, Editorial Programmer

"Apple MLX" is a labor-saving utility that allows almost fail-safe entry of machine language programs on the Apple computer. It runs on the II, II+, IIe, and IIc, and IIGS, with either DOS 3.3 or ProDOS.

Note: This is a new version of Apple MLX, with some slight changes. Be sure to use this version to type in all machine language programs in this and future issues of COMPUTE!'s Apple Applications.

A machine language program is usually listed as a long series of numbers. It's hard to keep your place and even harder to avoid making mistakes as you type in the listing, since an incorrect line looks almost the same as a correct one. To reduce the problems associated with typing in machine language programs, we've presented them as MLX listings which can be entered using the "Apple MLX" editor.

MLX checks your typing on a line-by-line basis. It won't let you enter inappropriate characters, and it won't let you continue if there's a mistake in a line or even if you're trying to enter a line or digit out of sequence. You don't have to know anything about machine language to use it. In other words, MLX makes machine language program entry almost foolproof.

Using MLX

Type in and save MLX to disk (you'll want to use it to enter programs in this and future issues of *COMPUTE!'s Apple Applications*, as well as programs in COMPUTE! magazine and Apple-specific books from COMPUTE! Publications). It doesn't matter whether you type it in on a disk formatted for DOS 3.3 or ProDOS. Programs entered with MLX, however, must be saved to a disk formatted with the same operating system as MLX itself.

If you have an Apple IIe, IIc, or IIGS, make sure that the key marked Caps Lock is in the down position. Type RUN. You'll be asked for the starting and ending addresses of the machine language program. These values are given at the beginning of the machine language program listing and in the program's accompanying article. Find them and type them in.

The next thing you'll see is a menu asking you to select a function. The first is (E)nter Data. If you're just starting to type in a program, choose this function. Press the E key, and the program asks for the address where you want to begin entering data. Type the first number in the first line of the program listing if you're just starting, or the line number where you left off if you've already typed in part of a program. Hit the Return key and begin entering the data.

Once you're in enter mode, MLX will print the address for each program line for you. You then type in all nine numbers on that line, beginning with the first two-digit number after the colon (:). Each line represents eight bytes and a checksum. When you enter a line and hit Return, MLX recalculates the checksum from the eight bytes and the address. If you enter more than or fewer than nine numbers, or if the checksum doesn't exactly match, MLX erases the line you just entered and prompts you again for the same line.

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Invalid Characters Banned

MLX is fairly flexible about how you type in the numbers. You can put extra spaces between numbers or leave the spaces out entirely, compressing a line into 18 keypresses. Be careful not to put a space between two digits in the middle of a number. MLX will read two single-digit numbers instead of one two-digit number (F 6 means F *and* 6, not F6).

You can't enter an inappropriate character with MLX. Only the numerals 0–9 and the letters A–F can be typed in. If you press any other key (with some exceptions noted below), nothing happens. This safeguards against entering extraneous characters. Even better, MLX checks for transposed characters. If you're supposed to type in A0 and instead enter 0A, MLX will catch your mistake.

MLX also checks to make sure you're typing in the right line. The address (the number to the left of the colon) is part of the checksum recalculation. If you accidentally skip a line and try to enter incorrect values, MLX won't let you continue. Just make sure you enter the correct starting address; if you don't, you won't be able to enter any of the following lines. MLX will stop you.

Editing Features

MLX also includes some editing features. The left- and right-arrow keys allow you to back up and go forward on the line you're entering so that you can retype data. Pressing the Ctrl (*Control*) key and the D (*Delete*) key at the same time removes the character under the cursor, shortening the line by one character. Pressing the Ctrl key and the I (*Insert*) key simultaneously puts a space under the cursor and shifts the rest of the line to the right, making the line one character longer. If the cursor is at the right end of the line, neither Ctrl-D nor Ctrl-I has any effect.

When you've entered the entire listing (up to the ending address that you specified earlier), MLX automatically leaves Enter mode and redisplays the functions menu. If you want to leave Enter mode before then, press the Return key when MLX prompts you with the address of a new line.

Display Data

The second menu choice, (D)isplay Data, examines memory and shows the contents in the same format as the program listing. You can use it to check your work or to see how far you've gotten. When you press the D key, MLX asks you for a starting address. Type in the address of the first line that you want to see and hit Return. MLX displays program lines until you press any key or until it reaches the end of the program.

Save and Load

Other menu selections are provided to let you save programs to disk and load them back into the computer. These are (S)ave File and (L)oad File. MLX asks you for the name of the file which contains the program. The first time you save a machine language program, there won't be a file on the disk containing the program. Whatever name you type in will be the name of a new file that's created.

The message DISK ERROR appears during a SAVE or LOAD if a problem is detected. If you're not sure why a disk error has occurred, check the disk drive. Make sure there's a formatted disk in the drive and that it was formatted by the same operating system that you're using for MLX (ProDOS or DOS 3.3). If you're trying to save a file and see an error message, the disk might be full. Either save the file on another disk or quit MLX (by pressing Q), delete an old file or two, and then run MLX again. Your typing should still be safe in memory. If the error message appears during a load, you may have specified a filename that doesn't exist on the disk.

Quit

The (Q)uit menu option has the obvious effect—it stops MLX and enters BASIC. (Of course, you can also press Ctrl-Reset to get out of MLX.)

The Finished Product

When you've finished typing all the data for a machine language program and have saved your work, you're ready to see the results. The instructions for loading and using the finished product vary from program to program. You'll almost always load and run an MLX-generated program by typing BRUN *filename* (or sometimes just BLOAD).

An Ounce Of Prevention

By the time you finish typing in the data for a long program, you may have several hours invested in the project. Don't take chances—use the "Apple Automatic Proofreader" to enter MLX, and then test your copy *thoroughly* before first using it to enter any significant amount of

data. Make sure all the menu options work as they should. Enter fragments of the program starting at several different addresses; then use the Display option to verify that the data has been entered correctly. And be sure to test the Save and Load options several times to insure that you can recall your work from disk. Don't let a simple typing error in MLX cost you several nights of hard work.

Line 100 of MLX traps all errors to line 610. If MLX is typed in correctly, only disk errors should be encountered. A disk-error message when you're not trying to access the drive—for example, when you first start entering data—indicates a typing error in the MLX program itself. If this occurs, hit Ctrl-Reset to break out of MLX and carefully compare your entry against the printed listing.

Apple MLX: Version 1.1

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
35 100 N = 9: HOME : NORMAL : PRINT CHR$ (
       17);"APPLE MLX V1.1": POKE 34,2: ON
       ERR GOTO 610
CC 110 VTAB 1: HTAB 20: PRINT "START ADDRE
       SS";: GOSUB 530: IF A = 0 THEN PRIN
       T CHR$ (7): GOTO 110
8C 120 S = A
E3 130 VTAB 2: HTAB 20: PRINT "END ADDRESS
         ";: GOSUB 530: IF S > = A OR A =
       0 THEN PRINT CHR$ (7): GOTO 130
28 140 E = A
B5 150 PRINT : PRINT "CHOOSE:(E)NTER DATA"
       ;: HTAB 22: PRINT "(D)ISPLAY DATA":
        HTAB 8: PRINT "(L)OAD FILE  (S)AVE
        FILE  (Q)UIT": PRINT
AE 160 GET A$: FOR I = 1 TO 5: IF A$ < > M
       ID$ ("EDLSQ",I,1) THEN NEXT : GOTO
       160
93 170 ON I GOTO 270,220,180,200: POKE 34,
       0: END
AF 180 INPUT "FILENAME: ";A$: IF A$ < > ""
        THEN PRINT CHR$ (4);"BLOAD";A$;",A
       ";S
A1 190 GOTO 150
6D 200 INPUT "FILENAME: ";A$: IF A$ < > ""
        THEN PRINT CHR$ (4);"BSAVE";A$;",A
       ";S;",L";E - S
92 210 GOTO 150
C2 220 GOSUB 590: IF B = 0 THEN 150
9E 230 FOR B = B TO E STEP 8:L = 4:A = B:
       GOSUB 580: PRINT A$;": ";:L = 2
85 240 FOR F = 0 TO 7:V(F + 1) = PEEK (B +
        F): NEXT : GOSUB 560:V(9) = C
F2 250 FOR F = 1 TO N:A = V(F): GOSUB 580:
        PRINT A$" ";: NEXT : PRINT : IF PE
       EK (49152) < 128 THEN NEXT
94 260 POKE 49168,0: GOTO 150
CC 270 GOSUB 590: IF B = 0 THEN 150
48 280 FOR B = B TO E STEP 8
A6 290 HTAB 1:A = B:L = 4: GOSUB 580: PRIN
       T A$;": ";: CALL 64668:A$ = "":P =
       0: GOSUB 330: IF L = 0 THEN 150
F9 300 GOSUB 470: IF F < > N THEN PRINT CH
       R$ (7);: GOTO 290
27 310 IF N = 9 THEN GOSUB 560: IF C < > V
       (9) THEN PRINT CHR$ (7);: GOTO 290
72 320 FOR F = 1 TO 8: POKE B + F - 1,V(F)
       : NEXT : PRINT : NEXT : GOTO 150
8E 330 IF LEN (A$) = 33 THEN A$ = 0$:P = 0
       : PRINT CHR$ (7);
22 340 L = LEN (A$):0$ = A$:0 = P:L$ = "":
        IF P > 0 THEN L$ = LEFT$ (A$,P)
E0 350 R$ = "": IF P < L - 1 THEN R$ = RIG
       HT$ (A$,L - P - 1)
55 360 HTAB 7: PRINT L$;: FLASH : IF P < L
        THEN PRINT MID$ (A$,P + 1,1);: NOR
       MAL : PRINT R$;
7B 370 PRINT " ";: NORMAL
E6 380 K = PEEK (49152): IF K < 128 THEN 3
       80
C1 390 POKE 49168,0:K = K - 128
5B 400 IF K = 13 THEN HTAB 7: PRINT A$;" "
       ;: RETURN
A7 410 IF K = 32 OR K > 47 AND K < 58 OR K
        > 64 AND K < 71 THEN A$ = L$ + CHR
       $ (K) + R$:P = P + 1: GOTO 330
C7 420 I = FRE (0): IF K = 4 THEN A$ = L$
       + R$
5F 430 IF K = 9 THEN A$ = L$ + " " + MID$
       (A$,P + 1,1) + R$
0A 440 IF K = 8 THEN P = P - (P > 0)
93 450 IF K = 21 THEN P = P + (P < L)
9D 460 GOTO 330
37 470 F = 1:D = 0: FOR P = 1 TO LEN (A$):
       C$ = MID$ (A$,P,1): IF F > N AND C$
        < > " " THEN RETURN
B8 480 IF C$ < > " " THEN GOSUB 520:V(F) =
        J + 16 * (D = 1) * V(F):D = D + 1
5F 490 IF D > 0 AND C$ = " " OR D = 2 THEN
        D = 0:F = F + 1
08 500 NEXT : IF D = 0 THEN F = F - 1
17 510 RETURN
B5 520 J = ASC (C$):J = J - 48 - 7 * (J >
       64): RETURN
AB 530 A = 0: INPUT A$:A$ = LEFT$ (A$,4):
       IF LEN (A$) = 0 THEN RETURN
6F 540 FOR P = 1 TO LEN (A$):C$ = MID$ (A$
       ,P,1): IF C$ < "0" OR C$ > "9" AND
       C$ < "A" OR C$ > "Z" THEN A = 0: RE
       TURN
2D 550 GOSUB 520:A = A * 16 + J: NEXT : RE
       TURN
28 560 C = INT (B / 256):C = B - 254 * C -
        255 * (C > 127):C = C - 255 * (C >
        255)
2F 570 FOR F = 1 TO 8:C = C * 2 - 255 * (C
        > 127) + V(F):C = C - 255 * (C > 2
       55): NEXT : RETURN
DA 580 I = FRE (0):A$ = "": FOR I = 1 TO L
       :T = INT (A / 16):A$ = MID$ ("01234
       56789ABCDEF",A - 16 * T + 1,1) + A$
       :A = T: NEXT : RETURN
1F 590 PRINT "FROM ADDRESS ";: GOSUB 530:
       IF S > A OR E < A OR A = 0 THEN B =
        0: RETURN
0D 600 B = S + 8 * INT ((A - S) / 8): RETU
       RN
B6 610 PRINT "DISK ERROR": GOTO 150
```

Apple Automatic Proofreader

Tim Victor, Editorial Programmer

It's easier than ever to enjoy programs for Apple II–series computers. "Apple Automatic Proofreader," an error-checking program for the Apple II, II+, IIe, and IIc, with either DOS 3.3 or ProDOS, alerts you to almost every typing mistake you might make.

"Apple Automatic Proofreader" will help you type in program listings without typing mistakes. It's a short error-checking program that hides itself in memory and attaches to your Apple's operating system. Each time you press Return to enter a program line, this routine displays a two-digit checksum at the top of your screen. If you've typed the line correctly, the checksum on your screen matches the one in the printed listing—it's that simple. You don't have to use the Proofreader to enter listings, but doing so greatly reduces your chance of making a typo.

Getting Started

First, type in the Apple Automatic Proofreader program following this article. The Proofreader can't check itself before it's done, so you'll have to be extra careful to avoid mistakes.

The Proofreader checks which operating system you're running before it hooks up the checksum routine, so you can type it in with either DOS 3.3 or ProDOS. If you want to use the Proofreader with both operating systems, you won't have to retype it. All you need is a utility to copy a file between disks with different formats, such as the one provided on the ProDOS *User's* or *System Utilities* disk.

As soon as you finish typing the Proofreader, save at least two copies. This is very important, because the Proofreader erases the BASIC portion of itself when you run it, leaving only the machine language portion in memory.

Now, type RUN and hit Return. The Proofreader clears the screen, loads the machine language routine, displays the message PROOFREADER ACTIVATED, erases the BASIC portion of itself, and ends. If you type LIST and press Return, you'll see that no BASIC program is in memory. The computer is ready for you to type in a new BASIC program.

Entering Programs

Once the Proofreader is activated, you can begin typing in a BASIC program as usual. Every time you finish typing a line and press Return, the Proofreader displays a two-digit checksum number in the upper-left corner of the screen. Compare this checksum with the two-digit checksum printed next to the corresponding line in the program listing. If the numbers match, you can be pretty certain the line was typed correctly. Otherwise, check for your mistake and type the line again.

A common mistake when entering BASIC programs on the Apple occurs when you accidentally press a key while holding down the Control key. This adds an invisible control character to the line you are typing. If you don't find it before you run the program, this stray character may cause a SYNTAX ERROR or other mysterious behavior. Fortunately, the Proofreader detects the presence of these invisible control characters and displays a checksum that doesn't match the one in the listing. So it's always a good idea to retype a line if the checksums don't match, even though you might not see any difference in the lines themselves.

The Proofreader ignores space characters, so you can omit spaces between keywords and still see a matching checksum. Spaces are important only between the quotation marks of PRINT statements or string assignments. The only mistake the Proofreader won't catch is if you accidentally type too many spaces or leave some out. For this reason, be extra careful when you're entering text within quotes.

Before running another BASIC program, it's a good idea to turn off the Proofreader by holding down the Control key while pressing the Reset button. The machine language part of the Proofreader is kept in memory starting at address 768 ($300 hexadecimal). This location is out of BASIC's way, but a lot of other programs use this same place for their machine language subroutines. Disable the Proofreader to avoid conflicts.

How It Works

When the Applesoft BASIC interpreter needs to get a line of input from the keyboard, it calls a machine language routine in the Apple's read-only memory (ROM) called GETLN. GETLN, in turn, calls the operating system to get a single keypress, which it stores in an input buffer. If the Return key was pressed, GETLN ends, leaving one new line for the BASIC interpreter in the input buffer. Otherwise, it repeats the process, asking for another keypress.

The operating system normally gets individual keystrokes from a ROM routine called KEYIN, but the Proofreader changes this. When the Proofreader is installed, the operating system calls the checksum routine instead, and the checksum routine asks KEYIN for a character. If any key other than Return was pressed, the checksum routine just passes it on to the operating system, which gives it to GETLN. But if Return *was* pressed, the checksum routine examines the contents of GETLN's input buffer, which now contains an entire line of input, to calculate the checksum that it displays at the top of the screen.

A common typing mistake is transposition—typing two successive characters in the wrong order, like *PIRNT* instead of *PRINT*. A checksum program that merely adds the codes of the characters in a line can detect only the presence or absence of a character, not transposition errors. Because the Apple Proofreader uses a sophisticated formula to compute checksums, it alerts you to transposed keystrokes.

The Apple Automatic Proofreader detects almost every possible typing mistake, including transpositions, missing or extra characters, accidental control characters, and incorrect line numbers. Typing *COMPUTE!'s Apple Applications Special* programs into your Apple computer has never been easier.

Apple Automatic Proofreader

```
10 C = 0: FOR I = 768 TO 768 + 68: REA
   D A:C = C + A: POKE I,A: NEXT
20 IF C < > 7258 THEN PRINT "ERROR IN
   PROOFREADER DATA STATEMENTS": END
30 IF PEEK (190 * 256) < > 76 THEN POK
   E 56,0: POKE 57,3: CALL 1002: GOTO
   50
40 PRINT CHR$ (4);"IN#A$300"
50 POKE 34,0: HOME : POKE 34,1: VTAB 2
   : PRINT "PROOFREADER INSTALLED"
60 NEW
100 DATA 216,32,27,253,201,141
110 DATA 208,60,138,72,169,0
120 DATA 72,189,255,1,201,160
130 DATA 240,8,104,10,125,255
140 DATA 1,105,0,72,202,208
150 DATA 238,104,170,41,15,9
160 DATA 48,201,58,144,2,233
170 DATA 57,141,1,4,138,74
180 DATA 74,74,74,41,15,9
190 DATA 48,201,58,144,2,233
200 DATA 57,141,0,4,104,170
210 DATA 169,141,96
```

aa

Apple Disk

All Apple II programs in this issue are available on the companion *Apple Applications Disk*. Formatted for both DOS 3.3 and ProDOS, the *Disk* costs $12.95, plus $2.00 shipping and handling, and can be purchased only through COMPUTE! Publications. See page 45 for details.

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103 Abracadata	60
104 Advantage Computing	128
105 AppleFest '88 Boston	4–5
106 AppleWorks Journal	116
107 Applied Engineering	1
108 Applied Engineering	22–23
109 Avalon Hill Game Company	29
110 Barnum Software	100
111 Beague Brothers	16–17
112 Cheatsheet Products, Inc.	108
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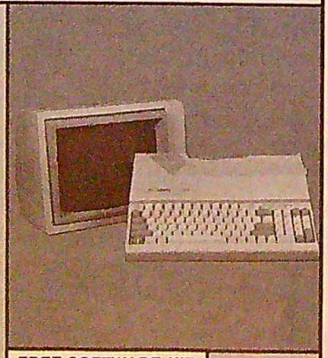

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128	129	130	131	132	133	134	135	136
137	138	139	140	141	142	143	144	145
146	147	148	149	150	151	152	153	154
155	156	157	158	159	160	161	162	163
164	165	166	167	168	169	170	171	172
173	174	175	176	177	178	179	180	181
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   500–999 ☐ 239
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   2000 or over ☐ 241
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   Under 18 ☐ 243
   18–29 ☐ 244
   30–44 ☐ 245
   45–65 ☐ 246
   Over 65 ☐ 247

9. What is the highest level you completed in school?
   Some high school or less ☐ 248
   High school graduate ☐ 249
   Attended college 1–3 years ☐ 250
   College graduate ☐ 251
   Post-graduate study without degree ☐ 252
   Master's degree ☐ 253
   Doctoral degree ☐ 254

10. Would you describe your present occupation as
    Student ☐ 255
    Manufacturing/service ☐ 256
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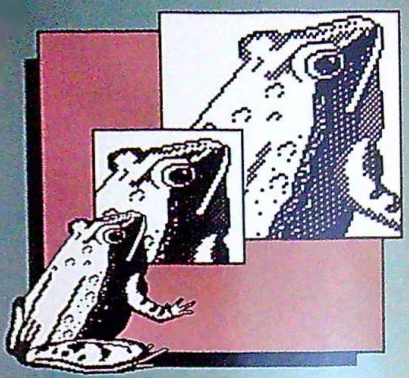

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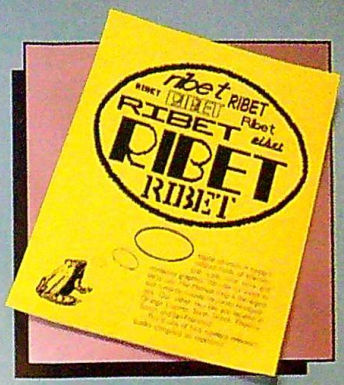

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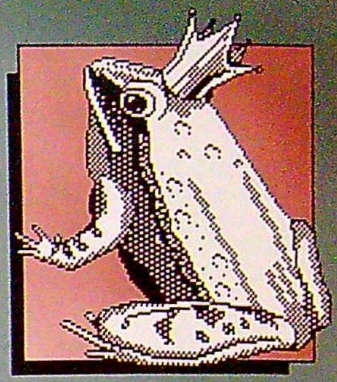

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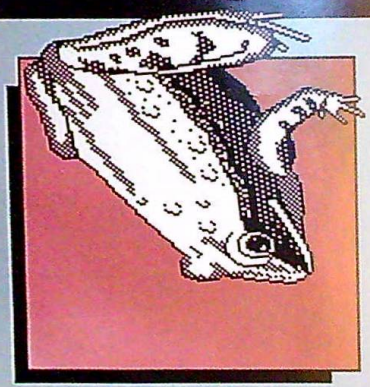

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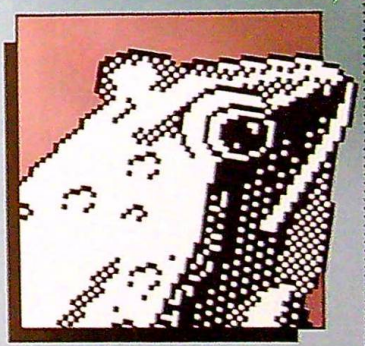

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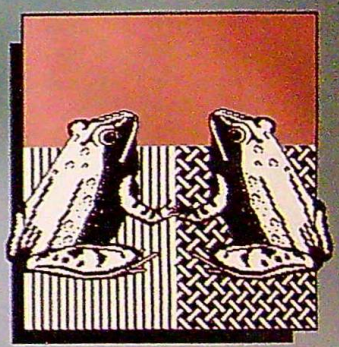

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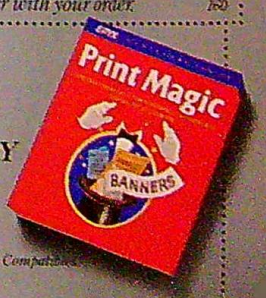

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